University News

WEEKLY JOURNAL OF HIGHER EDUCATION — MONDAY, NOVEMBER 28, 1994

V.H. Mulimani

Creativity, Discovery and Science

K. Venkata Reddy

The Importance of Being a Teacher

J.P. Srivastava

Technical Education at PG Level

S. [illegible] Bihari Mohanty

Institutional Planning in Higher Education

K.R. Narayanan

Technological Colonialism
— Convocation Address

ICORG-94

Plant Pathologists Meet

Guidelines for Research Projects

Frontiers in Microbial Technology

Association of Indian Universities

AGRICULTURAL SCIENTISTS RECRUITMENT BOARD (ICAR)

KRISHI ANUSANDHAN BHAVAN PUSA

NEW DELHI - 110012

Advt.No. 3/94

Applications are invited for the following Scientific posts under the different Institutes and at the Headquarters of the Indian Council of Agricultural Research, New Delhi.

DIRECTORS OF INSTITUTES AND PROJECT DIRECTORS: Pay Scale: Rs. 4500-7300, Age : Below 50 years.

1. Director, Central Institute for Cotton Research, Nagpur: (one post).

Qualifications Essential : i) An eminent Scientist with published work of high quality and actively engaged in research/teaching/extension education. ii) Good academic record with doctoral degree in any branch of Agricultural Sciences. iii) 15 years' experience (excluding the period spent in obtaining the Ph.D degree subject to a maximum of 3 years) of research/teaching/extension education, out of which at least 5 years should be as a Principal Scientist or in an equivalent grade. iv) Evidence of substantial contribution to research and scholarship as evidenced by variety product or technology developed or adopted as result of research; the quality of publication of papers in professional journals of repute; approved recommendations emanating from research or innovations in teaching/educational technology. v) Research experience in Fibre Crops.

2. Director, Vivekananda Parvatiya Krishi Anusandhan Shala, Almora: (One Post).

Qualifications Essential : i) As in Item No. 1 (i) above. ii) Good academic record with a doctoral degree in any branch of Agricultural Sciences. iii) As in Item No. 1(iii) above. iv) As in Item No. 1(iv) above v) Experience in any field of agricultural research.

3. Director, National Research Centre for Agroforestry, Jhansi : (One Post).

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctoral degree in Agricultural/Related Science. iii) As in Item No. 1(iii) above. iv) As in Item No. 1(iv) above. v) A good background and specialisation in Agroforestry Research.

4. Director, National Research Centre for Rapeseed & Mustard, Bharatpur : (One Post).

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctoral degree in Agricultural/Science. iii) As in Item No. 1(iii) above. iv) As in Item No. 1(iv) above. v) Specialisation and experience of research in Plant Breeding/Genetics in Rapeseed Mustard

5. Project Director, National Research Centre on Equines, Hissar : (One Post)

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctoral degree in Veterinary Science/Animal Husbandry iii) As in Item No. 1(iii) above. iv) As in Item No. 1(iv) above. v) Specialisation and relevant experience in equine health, management and production.

6. Project Director, Directorate of Rice Research, Hyderabad (One Post).

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctoral degree in any branch of Agricultural Sciences. iii) As in Item No. 1(iii) above, iv) As in Item No. 1(iv) above. v) Research experience in Rice.

7. Project Director, (N.A.R.P.), Indian Council of Agricultural Research Headquarters, New Delhi : (One Post).

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctoral degree in any branch of Agricultural Sciences. iii) As in Item No. 1(iii) above. iv) As in Item No. 1(iv) above. v) Specialisation and experience of research in any field of Agricultural Science with experience of handling research projects at a state or national level.

PROJECT COORDINATORS : Pay Scale Rs. 4500-7300, Age : Below 50 years.

8. Project Coordinator (Pearl Millet), ICAR Headquarters, College of Agricultural Campus, Pune, but likely to be shifted to an alternate location in Rajasthan : (One Post).

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctoral degree in any branch of Crops Sciences. iii) 13 years' experience (excluding the period spent in obtaining Ph.D degree subject to maximum of three years) of research/teaching/extension education, out of which at least three years should be as a Principal Scientist or in an equivalent grade iv) As in Item No. 1(iv) above. v) Specialisation and experience or research in the field of Pearl Millet.

9. Project Coordinator (Fruits), Central Institute of Horticulture for Northern Plains, Lucknow : (One Post).

Qualifications Essential : i) As in Item No. 1(i) above. ii) Good academic record with a doctorate degree in Horticulture/Plant Breeding or Plant Physiology. iii) As in Item No. 8(iii) above. iv) As in Item No. 1(iv) above. v) The candidate should have acquired sufficient research experience and specialisation in resolving production problems of sub-tropical fruits.

IMPORTANT NOTES : (i) Explanation for the purpose of qualifications in respect of Scientific posts at S.No 1 to 9 above "An ARS Scientist shall, in respect of the Master's degree acquired before his induction/recruitment, be deemed to possess the degree in the discipline in which he/she was inducted/recruited." (ii) The posts appearing at S.No 1 to 9 will be filled up on tenurial basis for a period of five years

LAST DATE FOR RECEIPT OF APPLICATIONS IN AGRICULTURAL SCIENTISTS RECRUITMENT BOARD OFFICE IS 10.1.95.

(For candidates from abroad and in the Andaman and Nicobar Islands, Lakshadweep, Minicoy and Amindivi Islands, States/Union Territories in the North-Eastern Region, Ladakh division of J&K State, Sikkim, Pangi, Sub-division of Chamba, Lahul and Spiti districts of Himachal Pradesh, Last date will be 25.1.95.)

GENERAL INSTRUCTIONS : 1. For application forms, please write to the Secretary, Agricultural Scientists Recruitment Board, Krishi Anusandhan Bhavan, Pusa, New Delhi-110012. Request for forms must specify Advertisement No. 3/94, Name of the post and Item No and should be accompanied by a self addressed unstamped envelope (23 x 10 cms. size). 2. Separate application, with separate fee, is required for each post. 3 Application forms complete in all respects, should reach office of the ASRB together with the application fee of Rs. 8/- (No fee for SC/ST candidates) in the form of crossed Indian Postal Order drawn in favour of the SECRETARY, INDIAN COUNCIL OF AGRICULTURAL RESEARCH, before closing date. Applications received after the closing date will not be entertained. IN CASE A CANDIDATE ANTICIPATES DELAY IN FORWARDING OF HIS APPLICATION THROUGH PROPER CHANNEL, HE MUST SEND AN ADVANCE COPY OF THE APPLICATION ALONGWITH THE FEE, WHICH MUST REACH THIS OFFICE ON OR BEFORE THE CLOSING DATE. 4. Candidates abroad may apply on plain paper and send their applications together with an International Postal Order/Bank Draft covering the application fee drawn in favour of the SECRETARY, INDIAN COUNCIL OF AGRICULTURAL RESEARCH so as to reach the office of ASRB by the closing date. In countries where regular commercial channels are not available, the candidates can deposit the application fee in local currency with the Indian Missions/Posts abroad, who in turn will issue on RBI draft in favour of SECRETARY, ICAR, NEW DELHI-5. Only the candidates belonging to SC/ST would be considered against the respective reserved posts. As such, General candidates NEED NOT APPLY against the reserved posts. 5. Crucial date for determining the age limit for candidates for each post will be the closing date for receipt of applications from candidates in India. There will be no maximum age limit for ICAR employees. Relaxation in age is allowed to SC/ST persons to the extent permissible under the rules. 7. The prescribed Essential Qualifications are minimum and possessing of same does not entitle candidates to be called for interview. Where the number of applications is large, the Board may restrict the number of candidates for interview to a reasonable limit on the basis of qualifications and experience higher than the minimum prescribed in the advertisement. 8. For all Technical posts and other Non-Scientific positions a screening test may be conducted by the Board, to be followed by an interview. 9. T.A. contribution will be admissible to those called for interview as per ICAR Rules. 10. If required, candidates must appear for personal interview. 11. Higher initial pay may be recommended by the ASRB for specially qualified and experienced candidates for all the posts. 12. Canvassing, in any form, will disqualify a candidate.

davp 1020(12)94

UNIVERSITY NEWS

VOL. XXXII NOVEMBER 28
No. 48 1994
Price Rs. 5.00

A Weekly Journal of Higher Education published by the Association of Indian Universities

IN THIS ISSUE

Creativity, Discovery and Science 1
The Importance of Being a Teacher 5
Technical Education at PG Level 8
Institutional Planning in Higher Education 10
Convocation
Indian Institute of Technology, Delhi 12
Campus News
Symposium on Frontiers in Microbial Technology 18
Computer Applications in Social Sciences 19
Agriculture
Plant Pathologists Meet 20
News from UGC
Countrywide Classroom Programme 21
News from Abroad
Sanctions Against Quality Assessment Failure 23
Book Review 25
Research in Progress 27
Theses of the Month 31
Classified Advertisements 35

Opinions expressed in the articles are those of the contributors and do not necessarily reflect the policies of the Association.

Editor :
SUTINDER SINGH

Creativity, Discovery and Science

V.H. Mulimani*

A scientist is a white coated, completely logical thinking machine. Objective, precise, unbiased, free from prejudice, using inductive rather than deductive reasoning, he is cold as an electronic computer. He deals in things you can handle, touch, measure in a quantitative manner and verify, not with ephemeral disembodied concepts. The scientist works meticulously, adding one irrefutable fact to another until, the whole of reality is systematized and categorized. Intent on wresting secrets from an unwilling nature, such a man is left devoid of the finer feelings which characterise a normal human being.

At the core of science is the experimental method, with the idea that it is possible to carry out carefully designed studies under controlled conditions in a repeatable manner. What we find in an experiment, or in life in general for that matter, is largely what we expect to find, and is conditioned to a great extent by our own background, experience and expectations. When we work in a laboratory our results are determined in large measure by previous schooling, and by years of rigorous training to develop a scientific bent — which teaches us to ignore findings that do not correspond with our preconceptions.

Research ability is something one learns by working with experienced investigators and is somewhat similar to the acquisition of any sort of craftsmanship. Undoubtedly, some people have more research ability than others, some make discoveries rather frequently, others once or perhaps never in their lifetime. Which are the factors involved? The subject is of great interest and well worth thinking about. This might finally provide a description of the necessary actions and circumstances leading to discovery. We would then be prepared to teach our students how to do research more rationally and perhaps we could program some sort of special computer to make discoveries for us.

There is no reason why we should not find better ways and new strategies to carry out our research and to make discoveries more frequently. After all mankind has been using the experimental method for only a few years. We can consider that experimental science started about four centuries ago, a short period compared with the appearance of Homosapiens which is believed to have occurred perhaps more than 400 centuries ago. This is true for rational experimentation because primitive forms of experiments are perhaps as old as man and are practised also by animals. What else do young animals and humans do during their play? They are learning, experimenting on ways of defending themselves and dealing with the world around them.

One of Galileo's experiments gives an idea of the scientific atmosphere that dominated when experimental science was born. Our mental attitude has changed considerably since Galileo's time. Now many of us trust blindly in the result of experiment. However, probably we have not touched the ceiling of our methodology for discovery and

---

Department of Biochemistry, Gulbarga University, Gulbarga-585 106.

surely there are still some possibilities for improvement.

After slow start experimental science developed with an increasing acceleration, the greatest changes having occurred during our lifetime. Therefore, scientists of our generation, who have spent a lifetime in research laboratories and who met many of the world's leading scientists, should have considerable amount of information on how many small or large discoveries were made and on the best product of discovery.

Types of Discovery

The elements involved in uncovering new facets are variable. In some cases discovery is simply an intellectual act. In others, the mental machinery is supported by observation and in still other cases, the mental and observational elements are complemented by experiment. Different disciplines use mainly one of these elements. We might take pure mathematics as an example of a discipline that can advance by purely mental activity. Astronomy, systematic botany and zoology are based mainly on observation, whereas Chemistry, Physics and Biology are experimental, that is, they apply experiments in addition to the mental and observational elements.

The Act of Creation

Human brain is a machine of rather limited capacity to create and adopt new ideas. The proof of this is how most of people stick to their ideas even if abundant evidence shows them that they are wrong. It is not generally known how difficult it is for a human mind to develop a new idea even if it has only a small element of newness. One only has to think of the invention of a simple device such as wheel, which was discovered by only one or a few groups of people, which fairly advanced civilizations remained ignorant of it.

The usual procedure for progress is to add very small new ideas to previously existing facts. The growth of knowledge occurs by small jumps and thus appear continuous. Large jumps are extremely rare. New ideas and inventions occur to people who are thinking constantly on a problem. This thinking has to produce a great preoccupation and even become painful. Then all of a sudden and perhaps as a consequence of some unconscious thinking the solution emerges "*Eureka*", "I have found it". The case of Archimedes in his bath can be taken as an example of discovery by brain work complemented with observation. According to one version, Hiero, king of Siracuse, had given a certain amount of gold to his goldsmith. The latter had made a very beautiful crown, but the king suspected that some gold had been replaced by silver. So he asked Archimedes to tell him if the crown was pure gold or not, but without destroying any part of it. Probably Archimedes knew that gold is denser than silver (in today's units the density of gold is 19.3 compared to 10.5 for silver); but how could he measure the volume? Presumably the problem rolled around his mind for sometime. While taking a bath he noticed how his body became lighter on immersion and how the water level increased. There are so many different versions of this episode that it is difficult to guess how his thinking went on, but he may have planned to weigh the crown in air and in water and then do the same with pure gold and pure silver. Anyhow, he solved the problem, and according to the tale, he ran in the streets in the nude shouting "*Eureka*".

The tale stresses the fact that Archimedes had been thinking hard, perhaps painfully on his problem and then a mental association with a different set of facts discharged the solution.

Whatever the mechanism of birth of new idea, one of the requirements is a situation which stimulates thinking. The story of Archimedes in his bath is one case of a more general fact. People seem to think better and generate more ideas in the bathroom. One of the scientists frequently came to the laboratory saying that while he was bathing it had occurred to him that such and such experiments should be tested. Several other scientists have come various times with bathroom-generated ideas which were often very good. Other scientists report that their best ideas occur while they are in bed and specially in the early hours of morning. Peace and isolation are probably the main advantages of bath and bed in relation to other parts of the house. There are no reports on new ideas having been generated in the turmoil of a cocktail party. Discussion between four or five people engaged in the solution of the same problem or perhaps working on the same research project can be fruitful provided the necessary isolation can be obtained. Similar arrangements have been called brainstorming sessions and have had some successes.

Observational Sciences

Before experiment became established as a part of the scientific endeavour the mind had to rely on observation only. Darwin's monumental work on evolution relied mainly on observations. Before him several others had held the idea that living things varied in form and that there occurred some kind of evolution. However, thanks to Darwin's pains-taking and careful set of observations that the theory of evolution gained widespread acceptance. There are many discoveries in his work, but the largest mental "jump" was when he hit on the idea of natural selection. The time must have been ripe for this new idea because as often happens it occurred independently to another person, Alfred Russel Walloce.

It is interesting to point out that Darwin, like many other people engaged in wresting secrets out of nature, gave some thought to the mechanism of discovery.

These are his words: "I have been speculating last night what makes a man discoverer of undiscovered things, and a most perplexing problem it is. Many men who are very clever — much cleverer than the discoverers — never originate anything. As far as I can conjecture, the art consists in habitually searching for the causes and meaning of everything which occurs".

Darwin was well aware of the importance of keeping free from preconceived ideas: "I have steadily endeavoured to keep my mind free so as to give up any hypothesis, however much beloved as soon as the facts are shown to be opposed to it."

Experimental Science

The most powerful way devised by man for finding new facts is the experimental method. It consists in the alternative use of hypothesis checked by observations and experiment followed by a new hypothesis which is also checked and so on. This alternating procedure has led to increased rate of discovery and to the explosive development of science. It is difficult to imagine that man can develop a more powerful procedure, but as mentioned earlier, it is less than four centuries old, and surely it can be perfected and superseded.

Although we call it experimental science, there is an element of art, and perhaps intuition, in its practice. The cycle hypothesis — experiment — new hypothesis can be schematized as follows:

Stage	*Study of the problem*
1. Hypothesis	1a - imagining a hypothesis 1b - critical examination
2. Experiment	2a - design 2b - doing the experiment
3. Observation	an interpretation of experiment
4. New hypothesis	4a - imagining 4b - critical examination

For the observational sciences, the sequences would go directly from 1 to 3, that is without experiments. The limiting step in the whole process can be any of the different steps. The lack of library facilities or of adequate teachers can slow or stop the study of the problem and inadequate laboratory facilities can make experiment the bottleneck.

However, when the process of discovery is too slow, the step which is usually blamed for is that of finding a good hypothesis. The problem of creativity has been the subject of a lot of writing and discussion. In a conference on "The creative process in science and medicine" the participants, an elite gathering of distinguished scientists, agreed that the major element in scientific success is the ability to distinguish between ideas and good ideas. The important part seems to be the critical examination of the hypotheses so as to discard the bad ones, or those that cannot be tested with available methods. Critical judgement is required in order to avoid working a lifetime on trivial problems but if it is overstressed it may lead to a paralysis of the research work. So many factors are involved in scientific work that different people work with different styles.

Szent Gyorgi, nobel laureate has described two types of scientists; the Dionysians who work mainly by some sort of intuition or subconscious reasoning and the Apollonions who rely mostly on the logical rational elements. The two types complement each other; the Dionysians can open new horizons or unexpected alleys, and Apollonions are likely to develop these to perfection. According to Szent Gyorgy, most of the apollonions are very good at writing research projects and reports so that they get the lion's share of the research money. He considers that this is not healthy for the development of original research.

One common requirement for getting a new idea seems to be a precious period of obsessive thinking. This seems to have occurred to Archimedes and is evident in Watson's *Double helix*. This book contains an entertaining account not only of the scientific aspects but also of the motivation, rivalries and other common human characteristics involved in the process of discovery. Here the problem consisted in imagining models for a substance, Deoxyribonucleic acid (DNA), of fairly well known structure and checking if they agreed with X-ray diffraction data. After many unsuccessful attempts a model which agreed well with the experimental data was found. This was one of the most commented advances in science.

There are parts in Watson's book that reveal how in the cause of seeking the solution his thinking became obsessive. For instance, "Even during good films I found it impossible to forget the bases", "The fact that we had at last produced a stereochemically reasonable configuration for the backbone was always in the back of my head".

Besides the preoccupation on research, there are many other conditions that are necessary for discovery. Most of them are difficult to pinpoint. The reason why some scientists are very productive and others less so is not easy to identify. Usually it is taken as a fact that cannot be changed. Carl Cori referring to a case of non-productivity, said "He has no luck". This was a kind way of describing the fact that a person in question did not have personality nor the ability that make good scientists. In many cases the failure is due to factors which are difficult to identify. One reason can be that some people never give much thought to their research problems, their mind is occupied with other things and they never get obsessed with their work. Certain people do not have much imagination and have only few ideas while others are so full of new ideas that they may not have the time nor the patience to test them.

Discovery requires other ingredients besides those already mentioned, curiosity, patience and hard work....

Curiosity is another element lacking in some people, they look at nature around them but never ask themselves about the mechanism of all the marvellous things that one can see. One of the less entertaining and less romantic but most important factor is hard work. There does not seem to be any easy way to success other than doing many experiments and doing them well.

Stumbling on Discoveries

Everybody knows the contribution of Thomas Alva Edison, Scientist, who invented the electric bulb, the gramophone and cinematography. Edison and his associates had over 1,000 inventions to their credit. "Genius — is one percent inspiration and 90 percent perspiration". Edison himself was a living example of this saying.

Normally, discoveries and inventions are the result of years of hard work and persistence. But there are some discoveries and inventions; which are the outcome of mistakes; or accidents or could be termed as miracles. There is a word in the dictionary Serendipity — which means the faculty of making interesting findings, discoveries or inventions unexpectedly or by accident. Serendip was a former name of Srilanka. The word was coined by Horace Walpole in 1754 from the title of the fairytale. "The three princesses of Serendip" whose heroes were always making discoveries by accident and sagacity, of things they were not in quest of. There are many discoveries and inventions due to serendipity. Louis Pasteur is a familiar name, who discovered the now common vaccine. In 1980, pasteur was doing research on how to control cholera. He was growing the deadly cholera-bacteria in chicken broth. A few drops of it, mixed with chickenfeed, would kill the chicken which ate the feed. To keep the isolated chicken organism alive, he mixed fresh batches of broth everyday, and infected it with the previous day's broth. By mistake, once he let some newly infected broth lie for several weeks, when he remembered it and took out the broth, he wanted to find out what would happen if he fed it to the chicken. He expected them to die. Surprisingly, the chicken did not. They became slightly ill, but some recovered. Pasteur pursued his research and found that the dead cholera bacteria in the chickenfeed protected the birds from the live and normally deadly cholera bacteria. Thus was developed vaccines and vaccinations. From where did vaccination start? It started with the misplaced bowl of Louis Pasteur.

What about the discovery of penicillin, the antibiotic? In 1928, Alexander Fleming was studying the bacterium staphylococcus that causes throat infection. He was growing this organism in petridishes. One day, by mistake, he kept a groundlevel window of the laboratory open.

(*Contd. on page 7*)

The Importance of Being a Teacher

K Venkata Reddy*

"The quality of a nation depends upon the quality of its citizens. The quality of its citizens depends — not exclusively but in critical measure — upon the quality of their education. The quality of their education depends, more than upon any other single factor, upon the quality of their teachers." These words of American Commission on Teacher Education cannot be over-emphasised. The teacher is the living ideal, the fountain-head of knowledge and the potential guide to provide directive for the growth and development of students of today as the worthy citizens of tomorrow. To put it in a nutshell, the teacher is the backbone of the educational system, the maker of the mankind and the architect of the society.

Although in course of time the role and functions of teachers are changing, they are always regarded as the benefactors of mankind. Their work does not confine to a particular state or a country. It transcends all the limitations and boundaries and spreads the whole world. Similarly, their contributions do not confine to a particular period — months or years, but influence the entire span of time. That is why, Adams has observed, "A teacher affects Eternity : he can never tell where his influence stops".

The teacher is the principal agency for implementing educational programmes at various levels. Although his main role is and will be teaching and guidance of his pupils, he has to promote research, experimentation and innovation. Teachers are to play a pivotal role in extension and social service. They have to participate in the management of various services and activities which educational institutions undertake for implementing their programmes.

The teacher has a vital role to play in our effort to relate education to national development and social change. It is the responsibility of the teacher to guide and inspire his students, to enrich his discipline and to inculcate values which are in consonance with our cultural heritage and our social objectives. This involves the transmission of knowledge from one generation to another and extension of the boundaries of knowledge through research, investigation and enquiry. Various educational innovations like the restructuring of courses, introduction of examination reforms, making programmes relevant to social environment and community needs, developing new and emerging areas of studies can be brought about successfully only if the teacher accepts a progressive outlook on education.

Of all the different factors which influence the quality of education and its contribution to national development, the quality, competence and character of teachers are undoubtedly the most significant. The most important factor in educational reconstruction is the teacher — his personal qualities, his educational qualification, his professional training and the place that he occupies in the school or college as well as in the community. The reputation of a school or a college and its influence on the life of the community invariably depends on the kind of teachers working in it.

As the Ministry of Education document *Challenge of Education : A Policy Perspective* (1985) has mentioned, "Teacher performance is the most crucial input in the field of education. Whatever policies may be laid down, in the ultimate analysis, these have to be interpreted and implemented by teachers as much through their personal example as through teaching-learning processes" (p.54). The National Education Policy (1986) has similarly said, "The status of the teacher reflects the socio-cultural ethos of a society; it is said that no people can rise above the level of its teachers. The government and the community should endeavour to create conditions which will help motivate and inspire teachers on constructive and creative lines. Teachers should have the freedom to innovate, to devise appropriate methods of communication and activities relevant to the needs and capabilities of and the concerns of the community" (p.25).

---

* *Department of English, Sri Krishnadevaraya University, Anantapur, Sri Venkateswarapuram-515 003.*

However, the status of teachers deteriorated over the last few decades mainly due to poor service conditions of teachers, phenomenal expansion of the educational system, lowering standing of teacher education, negligence of duty by many teachers and changes in the value system of the society. It is, therefore, necessary to make an intensive and continuous effort to raise the economic, social and professional status of teachers in order to attract young men and women of ability to the profession and to retain them in it as dedicated, enthusiastic and contented workers. Very few persons with adequate attitude and ability can be attracted to the teaching profession by altruistic motive, social service and love for teaching. So, the provision of adequate remuneration, opportunities for professional advancement and favourable conditions of service and work, are the major programmes which will help to initiate and maintain this feedback process.

We have reached the threshold of the development of new technologies which are likely to revolutionise the classroom teaching. Unless capable and committed teachers are in service, the education system cannot utilise them for becoming a suitable and potential instrument of national development.

The role of the teacher in this context is not going to be easy and smooth. The teacher should have a genuine interest in youth and an understanding of psychology. He should be able to contribute to scholarship and advancement of the frontiers of knowledge. Apart from these traditional functions which continue to be as valid today as ever before, the teacher has to perform two new functions. First, he has to play an important role in the transformation of the education system through active participation in such programmes as restructuring of courses, examination reforms, faculty improvement, rural orientation, practical and relevant education. Secondly, he should have commitment to a society based on justice and should, therefore, strive for the inculcation of these values and extension of knowledge and skills to the society at large. In effect, the teacher should become an effective instrument in the processes of development and social change. He should be a key factor in the transformation of our value system.

It is no mere rhetoric to say that the destiny of the country is being made in the classrooms and the teacher has an important and vital role to play in the total programme of national development and social change. The first and foremost responsibility of the teacher is in relation to his students. His job cannot remain confined to delivering a set of lectures or mere 'coverage of syllabus'.

What is called for is a revolution in education— "changes in objectives, in content, in teaching methods, in programmes, in the size and composition of the student body, in the selection and professional preparation of teachers and in organisation." The primary objective should be to treat each individual student as an end in himself and to give him the widest opportunity to develop his skills, abilities and potentialities to the full. He should go out of the institution with a sense of values and purpose and fully equipped to play his role not only as a 'professionally trained person', but as an enlightened and dedicated member of the society, committed to the values of democracy, secularism and socialism.

The teacher should also accept his responsibility in the realization of our social objectives, which implies that education should be related to the 'life, needs and aspirations of the people'. From this point of view, it becomes important that the teacher becomes an active participant in (i) programmes of community development, (ii) adult education and extension, (iii) social and national services, (iv) co-curricular and extra-curricular activities, (v) programmes of non-formal education, and (vi) social and national integration.

Therefore, the role of the teacher as a dispenser of knowledge only, does not seem to be relevant. It is more important for him to initiate his students into the art of learning by helping them acquire the right mental attitudes and learning habits. Thus, the teacher's role is changing. His authoritative delivery of knowledge has to be supplemented by his spending more time diagnosing the learner's needs, motivating and encouraging them, and checking the knowledge acquired.

The teacher is now expected not only to inculcate knowledge but also to encourage thinking. He has to become more of an adviser, a partner to talk to. He has to help seek out conflicting arguments rather than hand out ready made truths. For this he will have to devote more time and energy to productive and creative activities.

To play this role more effectively, the teacher faces a greater challenge today than at any time in history. As an interpreter, the teacher has to place new knowledge and new experience within the context of what is already known and understood by the students. In order to be a good mediator, he has to understand a great deal about the way in which people at various ages and stages of development perceive the world around them. As a guide, he has to teach the student 'how to learn' rather than stuff his mind with factual information.

Teachers are being challenged to utilise new approaches and methods in an effort to improve learning outcomes. They have to seek improved ways of teaching by developing new programmes and instructional strategies such as enquiry approaches, simulation games, contract approaches, computer-assisted instruction and programmed learning materials. What is more, the teacher is confronted perpetually with the problem of determining his role as a consumer of the past and as an innovator of the future.

To meet the 'new' challenges boldly and to play his role meaningfully, the teacher, besides imparting knowledge, has to help the students understand the components of their conscious and unconscious personalities, the meaning of their dreams and aspirations and the nature of their relations with one another and with the community at large. In short, he has to teach his students not only the art of learning but also the art of living and working in a society which they must create as an embodiment of their cherished ideals and realised goals. Unless the teacher looks upon his job more as a mission or a vocation than as a mere means of livelihood, he can never discharge his 'new' responsibilities satisfactorily.

Creativity, Discovery and Science

(*Contd. from page 4*)

Through the window airborne dust and debris settled on one of the petridishes. Fleming observed the presence of a blue-green mould. He thought that he had made a mistake. Normally contaminated bacteria are discarded. Fleming retained the petridish. The petridish looked different as the normal cloudy appearance resulting from bacterial growth was absent. The presence of a clear area around the mould indicated that the bacterial growth had been checked. Fleming investigated further and found that a toxic substance produced by the mould had inhibited bacterial growth. He named it penicillin. So penicillin is really a tribute to Alexander Fleming's scientific genius as well as to the forgetfulness he had in one of those periods of 1928.

Indian Examples

The Raman Effect was discovered in 1928 when Professor Raman was just around forty and his coworker K.S. Krishnan was in his twenties. Of all his contributions, the Raman Effect was really the greatest.

Professor Saha was in his twenties when he thought of the idea during 1918-23 that the chemical elements in the stars will be in their ionised states because of the very high temperature prevalent there, and that this will be reflected in their spectral lines. This idea of Saha provided an experimental approach to studying the constitution of stars and thus the birth of modern astrophysics. Similarly, Dr. Satyen Bose was in the prime of his youth when he wrote that famous letter to Einstein wherein he had "tentatively" formulated the statistical mechanical treatment of photons; the light particles. Hence it came be known as the Bose-Einstein statistics.

Dr. G.N. Ramachandran, former Prof. of Biophysics, Madras University, proposed triple helical structure for collagen (the molecule that makes ligaments and tender in our bodies). G.N. Ramachandran followed his own masterful work on collagen with another, even more important and general proposal in 1963 when he was forty one. Together with his students, Drs. Ramakrishnan and V. Sasisekharan, he proposed the rules for how a protein chain may fold in three dimensional space, universally called as Ramachandran plot.

Technical Education at PG Level

J.P. Shrivastava*

There are around 400 technical institutions in the country and about 131 of these offer PG programmes. Mismatch between out-turn of PG students in various engineering disciplines and growing need of specialised trained manpower in the industry prompted the author to critically review the current position of PG education in the country. Admission to PG courses is controlled through "Graduate Aptitude Test in Engineering" (GATE), in addition to the provision of admitting sponsored candidates. In GATE-94, around 14,500 candidates qualified for about 10,000 seats under the PG programme. It is expected that in GATE-95, around 55,000 candidates will appear and 17,000 will qualify. In 1992, 6300 candidates were awarded PG degree and it is expected that in 1993, 1994 and 1995 around 6700, 7000 and 7300 candidates would have got or will get the PG degree.

The 131 institutions which offer PG programmes are classified in different groups :

Type-A : All IITs and IISc, Bangalore—6.

Type-B : Universities/University Faculties—11.

Type-C : Regional Engineering Colleges (RECs)—12.

Type-D : Bigger Size Engineering Colleges—15.

Type-E : Small Size Engineering Colleges—87.

Out of the 10,000 seats 20%, 22% and 10% are available in Type-A, Type-B and Type-C institutions respectively, whereas Type-D and Type-E institutions have 17% and 31% seats. It is observed that there is 4.32% and 8% yearly increase in seats in 1993 and 1994, whereas for the same years the increase in GATE qualified candidates is 38% and 28% respectively. These data indicate that interest in PG programmes is increasing at a faster rate than the facilities being created. In the Civil, Computer, Electronics, and Mechanical disciplines there are less seats whereas in Chemical, Pharmacutical and Textile disciplines seats are more. As many as 50% seats in Civil, Mechanical and Electrical disciplines are available, whereas in Computer, Electronics and Industrial & Production Engineering there are 15% seats only. In West Bengal, Uttar Pradesh, Tamilnadu, Maharashtra and Karnataka, the seats are maximum and maximum GATE qualified candidates are also from these states except Andhra Pradesh.

Type-A Institutions

Type-A institutions are centres of excellence of technical education system in the country. Around 60 students are awarded Ph.D. degree by each of the IITs which is 75% of the total Ph.Ds awarded from all technical institutions in the country. Similarly, each IIT also awards more than 300 degrees every year which is 30% of the total number of students who are awarded PG degree in the country. However, only 5% of the total number (46,000) of undergraduates passing out get their degree from IITs. The ratio of out-turn to intake in PG programmes in all IITs and IISc is more than 0.9. Thus, the IITs have primarily an environment of research and students are coming out through this environment. In general performance of all IITs is excellent.

Type-B Institutions

Amongst the Type-B institutions, the leading ones are: University of Roorkee, Anna University, Madras, Jadavpur University, Calcutta, Cochin University of Science and Technology, Cochin, Faculty of Engineering and Technology at Annamalai University, Annamalainagar, and at M.S. University Baroda. Intake in Type B institutions is 2160 which is 22% of total intake whereas out-turn in 1992 was 1256. The out-turn/intake ratio was 0.60. It is to be noted that compared to out-turn (1429) in 1987, 88, 89 the out-turn in 1990, 91, 92 has increased to 3455 which is 142% increase and indicates that during 1987 to 1989 large number of PG courses were introduced in the universities and the same trend is continuing.

Type-C Institutions

Type-C institutions are 12 RECs having an intake of 1060 which is 11% of the total intake. The out-turn in 1992 was 607 and thus, out-turn/intake ratio is 0.60. RECs at Warangal, Surthkal and Bhopal are performing very well whereas performance of REC at Nagpur, Calicut and Allahabad is good. Data for REC at Trichi is not available. REC at Durgapur, Kurukshetra, Rourkela, Surat, Jaipur,

---

Director, Shri G.S. Institute of Technology and Science, Indore-452 003 (M.P.)

Jamshedpur have shown very poor out-turn. From the above it may be noted that contribution from RECs in the development of PG programme is little and needs attention.

Type-D Institutions

Type-D institutions are those colleges where average out-turn of PG students during each of the years 1990 to 1992 was more than 50. There are 15 such colleges, leading ones being BIT, Pilani, College of Engg., Madras, and P.S.G. College at Coimbatore. Type-D institutions have an intake of 1640 which is 17% of total intake. The out-turn in 1992 was 1459. The out-turn/intake ratio was 0.85 which is much higher than REC's and close to that of IITs. The performance of these institutions may be rated as high.

Type-E Institutions

Type-E institutions are 87 in number where out-turn is less than 50 for each of the years 1990 to 1992. The intake capacity is 3140 and in 1992 the out-turn was 1211. The out-turn/intake ratio was 0.40. Among these types of institutions Delhi College of Engg., Delhi, Govt. Engg. College, Pune, Thapar Institute of Engg. and Tech., Patiala, Indian School of Mines, Dhanbad and University College of Engg., Hyderabad are doing good. However, performance of many colleges is very poor.

Conclusions

(1) Tamilnadu, Uttar Pradesh, West Bengal, Delhi, Gujarat, Punjab and Rajasthan are the states where more seats are available whereas in Andhra Pradesh, Bihar, Chandigarh and Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa there are less seats than GATE qualified candidates.

(2) In the disciplines of Civil, Computer, Electronics, Mechanical and Industrial Engineering there are less seats whereas in Agricultural, Chemical, Pharmacutical and Textile disciplines, available seats are more than GATE qualified candidates.

(3) In general, due to increase in GATE qualified candidates in the last two years, relatively better candidates are getting admission in master's degree programme. Tamilnadu, Uttar Pradesh, West Bengal are the three states from where the out-turn is maximum, whereas from Bihar, Gujarat, Punjab and Rajasthan it is relatively less.

(4) Type-A and Type-D institutions award 50% of the total PG degrees in the country. Although the out-turn from IITs is increasing in number however, their percentage is decreasing out of the total out-turn. RECs contribute only 10% of the total out-turn in PG programmes in the country. The PG out-turn from the universities is increasing every year considerably.

Recommendations

Those institutions from where the out-turn is very poor for the last 6 years should either discontinue the PG programme or should modify/diversify the programmes in other allied disciplines. New PG programme should be started in the disciplines like — Electronics, Computer, Mechanical and Industrial Engineering. Regional imbalance should be corrected in generation of PG level manpower. Eastern and Western regions should be encouraged to start PG programmes. In Eastern region at Bihar and Orissa, where 50% population of the country is living, have only 6% seats and, therefore, there is a need for creation of more facilities for PG programmes. Similarly, in Western Region at Gujarat and Madhya Pradesh more institutions should be included for PG programme, whereas in Maharashtra existing institutions be further strengthened.

Type-D institutions are emerging as potential centres of research. These should be further encouraged for Ph.D programmes so that Ph.D work spreads in institutions other than IITs and some universities.

All Regional Engineering Colleges should concentrate on PG programmes to increase the out-turn as reasonably good facilities are available there. REC at Jaipur, Kurukshetra, Rourkela, Durgapur and Surat have very poor out-turn and measures are required to be taken so that these may also contribute towards generation of manpower at PG level in the states.

Some institutions should be selected in the states for conducting PG programmes, specially in the disciplines like—Product Design and Development, Manufacturing Processes, Information System Design, Quality Control and Reliability Engineering.

For better quality education, improving the existing PG courses, developing future programmes, accreditation of potential institutions be done, to identify and help them to develop new centres of excellence in the country.

Notes

1. The data given here are collected by the author from various institutions and thankfully acknowledged.

2. Institution-wise performance can be supplied on request.

Institutional Planning in Higher Education

Sunil Behari Mohanty*

Every good institution plans for its development. Institutional planning helps the institution to grow systematically. The planning looks for community resources which can contribute to the development of the institution. The higher education is a neglected field. It does not have resources necessary for its desired level of maintenance. The government funds available for government and private colleges are generally limited to maintenance. Rarely these are meant for development. The assistance received from the University Grants Commission and other sources of assistance are not adequate. Hence, all good institutions try to plan for development with the help of resources available in the community. Institutional planning not only tries to have new physical facilities but also improvement in working of human and material resources including teaching techniques. The Kothari Commission gave importance to institutional planning. It said, "Even within the existing resources, however limited they may be, every educational institution can do a great deal more, through better planning and harder work, to improve the quality of education it provides. In our opinion, therefore, the emphasis in this movement should be, not so much on physical resources, as on motivating the human agencies concerned to make their best efforts in a co-ordinated manner for the improvement of education and thereby offset the shortcomings in physical resources."

Basic Characteristics

The basic characteristics of an institutional plan may be as follows:

> (a) Satisfaction of felt needs, (b) Utilisation of untapped resources in the college, (c) Mobilisation of available community resources for college development, (d) Opportunity to college personnel and community members to work as a team, (e) Flexibility, (f) Feasibility, (g) Institution specific strategies, (h) Cost effectiveness, (i) Continuation of the earlier incomplete projects, (j) Opportunity for innovation/action research, (k) Democratic approach, (l) Provision of periodic review of progress, (m) Sharing of responsibilities, and (n) Clear and achievable goals, etc.

Process

The process of drawing up an institutional plan starts with the felt needs. The felt needs can be ascertained and refined in a meeting of the staff members. The priority on the various types of projects is to be decided also in this meeting. Responsibilities are to be given for collection of data regarding implementation of each project and for formulating project proposals. The proposals are to be scrutinised in a subsequent meeting and operational strategies for each project are to be formulated. Once the project is set in motion, there are to be periodic reviews of the progress to suggest mid course corrections, if necessity arises. At the end of the project there should be an evaluation meeting.

Types of Plans

The institutional plans may be of various types — curricular, co-curricular, faculty development, development of physical facilities, etc. *The curricular plans* may be (i) supply of worksheets/self-learning materials to students, (ii) teaching through video recordings/films, (iii) teaching through field visits, (iv) Unit test/weekend test, etc.

The co-curricular activities plan may be (i) organisation of exhibitions, (ii) organisation of mock assembly/ parliament, (iii) organisation of club activities, (iv) organisation of athletic competitions, (v) organisation of drama/dance/music competitions, etc.

The plans for faculty development may be (i) induction programme for teachers (ii) refresher course for teachers, (iii) study visit for teachers, etc.

The plans for development of physical facilities may be (i) construction of additional classroom, laboratory, reading room, students' centre, toilet, etc., (ii) purchase of books for library, (iii) payment of subscriptions for journals, (iv) development of college garden, (v) fencing of the college compound, etc.

**Principal, A A Training College, Fakirpur, District Keonjhar, Orissa-758 002.*

The plans for college services may be (i) keeping the library remain open for longer hours, (ii) providing library facilities to members of the community, (iii) regular cleaning of the toilets, (iv) organising awareness campaigns in the neighbourhood, etc.

Conclusion

Institutional plans are generally found in private colleges. The community members establish private colleges through various types of fund collection drives. After the establishment of the college, the Principal takes up the responsibility of liaison. But the initiative of the community goes down soon after the college receives the grant. Institutional plan is necessary for both aided and government colleges. Innovation in teaching is the demand of the day. New technologies make teaching better and induce better learning skills in students. Due to developments in society, educated persons have more leisure time and can be engaged in voluntary teaching or taking charge of co-curricular activities. The Principals need to devote some time for this important aspect of qualitative improvement of higher education.

CALENDAR OF EVENTS

Proposed Dates of the Event	Title	Objective	Name of the Organising Department	Name of the Organising Secretary/ Officer to be contacted
Dec 21-23, 1994	15th Conference of Indian Society for Probability & Statistics	To apprise the participants of the current developments in Probability and Statistical Research	Department of Statistics, Manonmaniam Sundaranar University, Tirunelveli	Dr. V.S. Sampath Kumar, Organising Secretary, ISPS Conference, Department of Statistics, Manonmaniam Sundaranar University, Tirunelveli-627 009
Dec 27-29, 1994	28th National Conference of Indian Association of Teacher Educators	Theme : Teacher Education in Information Age	Faculty of Education, Banaras Hindu University	Dr. U.C. Rai, Organising Secretary of IATE, Faculty of Education, Banaras Hindu University, Varanasi-221 010
Jan 16-25, 1995	Computer Application in Social Sciences	To orient the social science researchers to fundamentals of computer, computer processing, foundation of data processing, quantification method and use of SPSS	Centre for Social Studies, Surat	Vimal Trivedi, Course Director, Centre for Social Studies, South Gujarat University Campus, Udhna- Magadalla Road, Surat-395 007
Feb 3-24, 1995	Refresher Course on Business Laws in Globalising Economy	To examine the teaching and research of Business Laws	The National Law School of India University, Bangalore	The Programme Coordinator, ASC Refresher Course, National Law School of India University, Bangalore-360 072
March 6-10, 1995	International Conference on Contract Management in Construction Industry	To review contractual clauses of leading agencies and to develop uniform structures of contract document	Central Board of Irrigation & Power, New Delhi	Mr. C.V.J. Varma, Member Secretary, Board of Irrigation and Power, Malcha Marg, Chanakyapuri, New Delhi-110 021

Technological Colonialism

Dr. K R Narayanan, Vice President of India delivered the Convocation Address at the annual convocation of the Indian Institute of Technology, Delhi. He said, "The third world seems to have chosen the easy path of depending on the science and technology of the developed countries. Technological colonalism may taste in the beginning sweeter than the old, political colonialism, but it is necessary to warn that it could enmesh the developing countries in a more suffocating embrace of dependence. We will have to get rid of what Nehru once called "the colonialism of the mind" and feel as much at home in Alipore village or in an Asian and African capital as in New York, Paris or London." And added, "What we call globalisation should not end up in alienation from our own roots and our own problems crying out for solutions and in mere westernisation or blind imitation of the West." Excerpts

As early as 1937 Pandit Jawaharlal Nehru had stated that "Even more than the present the future belongs to the science". That future has now taken shape. Nehru's pre-occupation then and afterwards was to use science to "solve the problems of hunger and poverty, of insanitation and illiteracy, of superstitions and deadening customs and tradition". At the same time he wanted India to climb the peaks of scientific knowledge. "It is true", he said, "these are high peaks which we climb while the general level of our life and achievements is low. But the fact that we are climbing these peaks represents a general growth because the peaks of achievement do not come from the sky." They are the results of the efforts of our own people, of our own scientists and technologists. The IITs, the atomic energy, space and the defence research establishments of India are not ivory towers irrelevant to the needs of the nation and the life of the people. They have proved to be the basis of our national strength and of benefit to the people in the manifold ways, direct and indirect. It is our scientific-technological potential that has made the Indian giant to move forward.

It has been said that in the new world that is emerging it would be economic, and not political or military power that will be decisive. And the core of economic power will be constituted by science and its applications. Therefore what economic and other policies we may adopt the degree to succeed will depend to a large extent on our capacity to master modern science and technology. Indeed in the history of the world conflicts mastery of science and technologies has been what often decided the outcome. This has been the main difference between the colonial powers and the subject nations. Today it is the main difference between the developed and the developing countries of the world.

The technological and the economic gap between the developed and the third world has been growing and under the dispensation of the open and globalized system this gap has become a widening gulf. It is only through a massive effort in Research and Development that this immense imbalance could be rectified to some significant extent. Today nearly 96% of the world R & D is concentrated in the developed countries, and only 4% in the developing countries. In India only 0.85% of GNP is devoted to R & D. In per capita terms we spend only $ 2.60 whereas it is between $ 100 and 800 in most developed countries and $ 50 in some of the newly industrialized countries. Our effort to double the R & D expenditure remains unfulfilled. It is well known that among the developing countries India is one of the most advanced in scientific-technological development. We boast of the third largest pool of scientists and technologists in the world. A massive and sustained effort in industry, agriculture and, sciences and in management and marketing is called for if we are to exploit for the benefit of the nation our vast scientific resources and the infrastructure that we have been able to build up. Now that we have liberalized and opened up our economy and our production at home and abroad is subject to intense international competition, R & D has become of a paramount importance. It is no longer enough that it is confined to government laboratories. The expanding private sector will have to share the burden to a substantial extent. Universities and other educational and research institutions will have to cooperate with industry in order to produce the required results.

I am glad that IIT Delhi is involved with private industry as well as government institutions, in sponsored projects and consultancies. Collaboration between its Bio-medical Engineering division and the All India Institute of Medical Sciences has resulted in developing a single injection for male fertility control. It is a path-breaking event which will have impact not only on our population growth but on gender equality in this country. The Centre for Applied Research in Electronics in this IIT has also succeeded in developing electronically variable phase shifters for radar. I am told that the DRDO has already placed bulk orders for them. I understand that IIT, Delhi has substantially contributed to various defence projects undertaken by DRDO. I also understand that the IIT, Delhi had undertaken a comprehensive review of its undergraduate programmes according to which emphasis is to be placed on industrial interaction, identification of national aspirations and exposure to emerging areas of technology. Such reviews of technological studies and interaction between educational and research institutions in the country with industry, agriculture and the service sector are now taking place in the country on an expanded scale. The importance of this cannot be exaggerated. Only this way can our peak institutions serve our country as well as the entire developing world. Long ago Nehru exhorted the Directors of our CSIR Laboratories that their work should be related to "the vital current of Indian life" and that "we must do independent thinking of our own in relation to what we require here."

Six or seven years ago I had the pleasure of being entertained to lunch by the Indian Students Association of Columbus, Ohio in USA. The President of the Association who was then a recent product of one of our IITs told me with pride that 80% of his classmates in India were sitting in that room for lunch with us. That was the measure of what is called brain drain. I am not one of those who blame our young people for migrating abroad. I feel that through wise policies the brain drain could be converted into brains banks for India abroad. But I could not but feel concerned about the volume of export of brain to other countries and ponder over the fact that our educational system was so designed that the best and brightest of our youth could fit in like glove on the hands of research institutions and industries in the developed countries. No doubt that they are blossoming out there in a way that is creditable to our country. But how is it that our own people feel more at home over there than in Delhi or Bombay or Calcutta, not to speak of in the Alipore village or another village in India. True, the facilities for research and scope of financial advancement are much greater over there than here in this country. But are not the challenges and opportunities available in our society and economy not big and gripping enough to attract the attention of our bright young men? I do not deny the innumerable obstacles that they may face in India. One cannot deny that our authorities, our senior scientific establishments and our society, are not as a whole prone to recognizing scientific talents and encouraging them. Nevertheless one cannot but ponder over the phenomenon of bright scientists not only from India but from other developing countries also migrating to the developed countries making the technological gap even greater.

Among the developing countries India has the greatest potential to emerge as a modern scientific technological power of significance if only we could organize and galvanize our resources and talents. If we desist from doing this, we will not only be missing out on our destined position in the world but letting down the third world some of whom may be more economically better off than us but not endowed with the same degree of technological infrastructure and talents. The third world today is at a greater disadvantageous position in relation to the developed countries both in economic and technological capabilities. What is alarming is that their position is deteriorating further. There has been a great deal of talk about South co-operation, but very little concrete achievements have came out of it. The third world seems to have chosen the easy path of depending on the science and technology of the developed countries. Technological colonialism may taste in the beginning sweeter than the old political colonialism, but it is necessary to warn that it could enmesh the developing countries in a more suffocating embrace of dependence. We will have to get rid of what Nehru once called "the colonialism of the mind" and feel as much at home in Alipore village or in an Asian and African capital as in New York, Paris or London. What we call globalisation should not end up in alienation from our own roots and our own problems crying out for solutions and in mere westernisation or blind imitation of the West.

One important byproduct of the advance of science and technology in the west has been the growing phenomenon of unemployment. This trend is still in the incipient stage. 8 to 11% of unemployment is the current level in America and Europe. A special issue of the *Newsweek* wrote recently, "Millions are out-of work. Precious talents are being wasted, and dreams are dying. What can be done!" Apart from this growing unemployment very nature of work is changing, resulting in the paradox of "Jobless growth". I should like to quote from the London *Economist*. It said: "in the work place .... the traditional career will die as firms scramble to respond to growing international competition and technological innovation. Every one will retrain constantly, changing professions not just jobs three or four times during their working lives. Permanent full-time jobs will be scarce. Engineers, marketing specialists, will have to accept temporary or part-time employment." If this trend continues as it is bound to, we may be heading for a society not based on work, certainly not manual work, with lot of time for leisure. One is reminded of Karl Marx's utopia where due to advance technology manual job and the working time will be radically abridged and there will be a super-abundance in the production of the necessities as well as the luxuries of life and with mankind leaping from what he called "the kingdom of necessity" to "the kingdom of freedom". Nobody will have any exclusive sphere of activity, but each one can become accomplished in any branch of work he wishes. It would be possible for him to do one thing today and another tomorrow, to hunt in the morning, fish in the afternoon, rear cattle in the evening, and criticise after dinner without ever becoming hunter, fisherman, shepherd or critic. Marx envisaged that each individual will enjoy the maximum free time to develop and enjoy the arts, sciences and so forth. In advanced societies and in advanced sections of some developing societies wealth and leisure have become a problem. Jaeque Velors, the former Secretary General of the European Union, has said that "a new challenge of the relationship of the citizen and his leisure time" has already emerged.

But has the cultural development of man, of society, kept pace with the rapid and spectacular technological advance? What is emerging seems to be a new technological Brahminism when the brain and the automatic substitutes of the brain do increasing volume of work. Cultural pursuits are not the things occupying people liberated from drudgery, manual work and even work by their natural brain. In this context I cannot but recall Mahatma Gandhi and his philosophy. He held that certain amount of manual work is essential for the health of the human body and mind. He asserted that whatever benefits mechanization would bring to mankind it would bring unemployment. He once said: "But if by some chance one man could plough up the whole land of India, control all the agricultural produce, and if millions had no other occupation, they would ...... being idle become dunces, as many have already become." At another time he said that if "30 people can produce enough for 3 million people, he would not mind it provided the others could be given employment and some useful work."

Gandhiji posed the problem of technological development without limit, without social objectives and regardless of social and human consequences. We in India are far away from such a predicament of utilising leisure and dispensing with work. But unemployment is there and the problem that is beginning to afflict the West today might come to afflict us tomorrow. Technological advance without cultural advance is posing as dangerous a situation as the misuse of technology for destructive purposes. It is producing not men with culture, enjoying the arts, music and sciences but indulging in drugs, sex, violence and crime.

In this new predicament perhaps India with old civilization can offer something to mitigate the ills of pure scientific-technological growth. Jawaharlal Nehru in his *Discovery of India* wrote some reflective lines. "Eienstein, the most eminent among scentists tells us that 'the fate of the human race was more than ever dependent on its moral strength today. The way to a joyful and a happy state is through renunciation and self-limitation everywhere'. He takes us back suddenly from the proud age of science to the old philosophers, from the lust for power and profit motive to the spirit of renunciation with which India has been so familiar." But India has been fast losing that familiarity. In any case I am not advising you to become *Sanyasis* after passing out of this great institution. Neither Eienstein nor Nehru would have wanted you to do that. But I should like to tell you what Louis Pasteur used to exhort his students to do: "The future will belong to those who shall have done the most for suffering human humanity. First ask yourselves, what I have done for my education? Then as you advance in your life, what I have done for my country? So that some day supreme happiness may come to you, the consciousness of having contributed in some measure to the progress and welfare of mankind."

Extracts from the Report

by

B.C. Nakra, Offg. Director

Academic Programmes

Our academic programmes cover a wide range of engineering and science disciplines at the undergraduate and postgraduate levels. During 1993-94, the enrolment at the Institute was:

B.Tech. & 5 year M.Sc./M.Tech.	:	1,185
M.Sc.	:	102
M.Tech.	:	617
D.I.I.T.	:	24
Ph.D.	:	652

It includes 59 foreign students from 15 countries.

The revision of the U.G. curriculum which began in 1989 has been recently completed. First batch of students under the new curriculum was admitted in 1992. One of the innovations approved by the Senate last year relates to offering of minor area programmes by Departments/Centres to students of other disciplines, to be taken up by the students in addition to their major area of graduation. These minor area programmes are: Computer Science, Management of Engineering Systems, Polymer Science & Engineering, Computational Mechanics & CAD, Industrial Electronics & Product Engineering.

A new category of courses under the 'Emerging Science & Technology' has also been approved for undergraduate students to cater to the futuristic trends in Science & Technology. Some of these are: Supercomputing for Engineering Applications, Concurrent Engineering, Photonic Devices and High Performance Composites.

At the postgraduate level, the Institute has started an interdisciplinary Master of Design (M.Des.) Programme in Industrial Design from 1994-95. The two-year programme aims at developing manpower in Industrial Design needed to meet the industries' requirement for designers capable of creating high quality user sensitive designs for the competitive markets.

Further, an integrated review of all the computer related programmes run by Computer Science & Engineering, Electrical Engineering and Mathematics Departments has been completed by an expert committee with outside participation and the report is under processing.

Another new initiative in M.Tech. and Ph.D. programmes has been to replace the scholarship scheme with a teaching/research assistantship scheme, whereby the students would render to the institute assistance for a fixed number of hours per week in addition to their normal academic work. Some assistantships from sponsored research programmes are also being made available, in addition to the Institute assistantships.

An Overall Curriculum Development Cell (OCDC) has been recently created with support from MHRD in which all Departments participate in curriculum development, holding of workshops for curriculum development, writing of textbooks, etc. During the year, five Q.I.P. short-term courses and twelve workshops, with participation of teachers from other colleges, were held. In addition, eleven book writing proposals were approved.

Research and Development

All the thirteen academic departments and nine inter-disciplinary research and development centres have been involved in research and development work sponsored by outside agencies.

I.I.T. Delhi is participating in four generic research areas under Technology Development Mission, viz., Photonic Devices & Technologies, Energy Efficient Technologies & Devices, New Materials, and Genetic Engineering & Biotechnology.

Some of the notable sponsored research and development work is as follows :

Civil Engineering Department has completed a project on material modelling and computational methods for river valley projects. Mechanical Engineering Department has completed a project on alcohol fuel substitution in automobiles involving fleet monitoring-cum-demonstration trials. A project on design and development of a high speed Modem for HF digital radios has been completed in Electrical Engineering Department. The Centre for Applied Research in Electronics completed recently projects on development of a twin-toroid ferrite phase shifters and millimetre wave IC components at KA-band. Centre for Polymer Science & Engineering completed projects on evaluation of polymer fibres for application on solar energy collection and role of interface in fibre reinforced composite integrity.

Projects on diamond-like carbon films by microwave discharge of hydrocarbon gases and on piezo-ceramic acoustic transducers are being pursued in Physics Department. Textile Technology Department is involved in a project on high tenacity acrylic fibres as a precursor for carbon fibres.

Industrial Tribology, Machine Dynamics & Maintenance Engineering Centre has established a pilot plant to convey granular products in dilute or dense phase mode through pneumatic conveying.

Applied Mechanics Department is continuing the work on the application of wind tunnel for air pollution problems. Instrument Design & Development Centre is involved in projects on development of a parametric sonar and digital laser speckle pattern interferometry. Research work in the Centre for Rural Development & Technology includes development of supercritical extraction unit for a number of plant products and biomass production in saline-alkali soil, which is promising for reclaiming of the wasteland.

Centre for Biomedical Engineering along with All India Institute of Medical Sciences, has been involved in the development of an injectable contraceptive for the male. A novel solution has been adopted combining concepts of electrical engineering with biomedicine. Use of a single injection to provide fertility control for many years is a revolutionary concept, which appears to be effective after animal trials and first phase of human trials. The second phase of trials is expected to be over in 18 months. Over the years, the programme received financial support for ICMR, WHO and Family Planning Foundation, with the Ministry of Health & Family Welfare now taking over the funding responsibility.

Industrial Interaction and Technology Transfer

The Institute lays considerable emphasis on cooperation with industry. In order to give a quantum jump to such cooperation, Foundation for Innovation & Technology Transfer (FITT) was set up recently. The Foundation is a registered society using IIT resources primarily but can use outside resources wherever required. During the year, there has been increased interaction between FITT and IIT in industry sponsored projects, technology development and HRD programmes. A diagnostic survey for technology upgradation and diversification of plastic and allied industries in Noida region has been completed by Applied Systems Research Group. A TQM group is also involved in industrial projects with FITT. The know-how of fibre optic educational kit has been transferred to industry and is under transfer for microelectronics educational kit.

Educational Technology Centre has passed on through FITT, a number of educational video programmes to outside users.

Softwares for acoustic image simulation, and another one for characterisation of multimeter wave finlines have been transferred to user industry by CARE.

The technology of 'Panel Processor for Route Interlocking System for Indian Railways' has been transferred to M/s Crompton Greaves Ltd., as an outcome of a sponsored project funded by DOE.

A number of industrial consultancy projects have been completed during the year. Some of the significant ones are: Development of application softwares in Meteorology for parallel processing super-computer, in cooperation with CDOT, Aerodynamic drag reduction of railway wagons, Development of blends/alloys of polyvinyl butyral with other polymers, Residual life assessment of pressure vessels, storage tanks and columns using fracture mechanics approach, Energy audit of Rajdhani Express, and Condition monitoring of power plant equipment through oil analysis.

IRD Unit has framed a comprehensive intellectual property rights policy in view of the emerging need to tie up with industry in matters related to know-how ownership, distribution and control. A software bank has been formed to enlist the computer programmes developed in the Institute, for the purpose of commercial exploitation.

Another means of interaction with industry is through continuing education programme. During the year, 23 such courses were conducted by CEP Unit including three UNDP and one SAARC sponsored training programme. Five other industrial HRD programmes were coordinated by the Institute faculty through FITT.

Infrastructural Facilities

During the year, a 16-node PARAM system with a high speed disc has been acquired in Applied Mechanics Department. The small scale demonstration facility for the bio-conversion of Lignocellulosic Biomass to Ethanol and Co-products, established with support of Ministry of Non-Conventional Energy Sources, is fully operational. Under Indo-UK Collaboration Programme, a 'Yorick head' has been installed for computer vision and AI research.

Centre for Applied Research in Electronics has acquired state-of-art EDA facility for designing electronic circuits and systems and also microwave design software for designing high performance microwave and millimetre wave integrated circuits. An experimental plasma system for volume generation of negative ions has been built in the Centre of Energy Studies. In instrument Design & Development Centre, a 14 bench modernised Electronic Laboratory has been established with DOE/World Bank Funding, with facilities for all CAD, data acquisition and measurements.

Centre for Educational Technology has a recording studio for video recording of lectures. During the year, 6 complete courses with a total duration of 216 hours, were recorded in addition to 2 shorter courses of 12 hours duration. The Centre has set up a Computer Aided Learning Laboratory for development of multimedia CAI packages.

Computerisation of the Central Library is in progress. The library has started resource sharing with over 20 libraries in Delhi. A dial-up Modem with compatible software, has been installed to facilitate electronic linkage with the participating libraries. CD-ROM facilities have been strengthened by additional databases. Video viewing facility has also been organised in the library.

Collaborative Programmes

A number of collaborative research projects are in operation with the institutions in UK, France, USA, Norway, Japan, Germany and Russia. Some of the major areas covered include: Microacoustic Devices, Sonar Technology, Atmospheric Sciences, Erosive Wear, Reliability, Availability & Maintainbility Engineering, Microprocessor Applications, Fibre Optics & Optical Communications.

The programme of training of scientists and engineers from developing countries renewable energy resources under the sponsorship of United Nations University is continuing. During the year under report, MOUs have been processed with University of Aden, Tarbiat Modarres University, Tehran and Tokyo Institute of Technology. In addition, student exchange programmes with INSA, Lyon in France, University of Massachussets, Amherst, USA, and New Jersey Institute of Technology, USA, are also taking place.

In order to provide administrative support to the various programmes relating to foreign collaborations, an International Relations & Programme Office (IRPO) has been set up at the Institute.

Several MOUs are currently in operation with universities, research and industrial organisations in India. During the period under report, the Institute entered into MOUs with Electronics Trade & Technology Development Corporation Ltd., Rolta India Ltd., and National Institute of Hydrology. A number of research projects have been carried out in collaboration with NPL. In addition, the MOUs with the following are under processing: Central Electronics Engineering Research Institute, Pilani, and Commonwealth Universities Study Abroad Consortium.

Student Activities

The Board of Recreational and Creative Activities organised a large number of functions besides Rendezous-93 and Students Week. Board of Sports Activities organised SPORTECH - 93 in which a large number of local institutions participated both in men and women sections. Institute Squash Rackets team participated in the All India Inter-University tournament held at Roorkee University. 73 students took part in Birla Open Sports Meet held at Pilani where Squash, Rackets and Swimming teams got first place and Hockey and Power lifting teams secured second place.

In the Inter-IIT Sports meet at IIT Bombay, Institute Hockey and Basketball teams got first place in the men section. In the women section, the general championship was won for the third

(Contd. on page 26)

CAMPUS NEWS

Symposium on Frontiers in Microbial Technology

'There is need to popularise casava (sabudana) as an effective alternative in place of agar or gelatin for culturing the microbes under laboratory conditions,' observed Dr. Y.L. Nene, Dy. Director General of ICRISAT, Hyderabad. He was inaugurating the three-day national symposium on 'Frontiers in Microbial Biotechnology' organised by the department of Botany at Kakatiya University in Warangal recently. The symposium was sponsored by the UGC and CSIR.

Dr. Nene said that casava (sabudana) was cheaper than agar or gelatin for isolation and study of microbes and its use in the laboratories would reduce the research costs to a great extent and added that transparency of sabudana had to be increased in order to improve its efficiency as a culture medium. Dr. Nene also referred to the use of mushrooms in ancient India for various food and medicinal purposes.

Prof. T. Vasudev, former Vice-Chancellor of Kakatiya University, who presided, briefly touched upon the growth and development of microbial biotechnology in the fields of medicine, agriculture and other sciences. He also released a volume containing the abstracts of the papers. He said that education was incomplete without the knowledge of micro-organisms and no one could ignore its relevance in the present-day world.

In his keynote address Prof. K.S. Bilgrami, CSIR Emeritus Scientist at Bhagalpur University said that biotechnology had undergone a tremendous improvement with advancement in the areas of microbial genetics and biochemistry. This would lead to the development of high efficiency strains for synthesizing better quality of antibiotics like penicillin, cephalosporin and other microbial degraders of cellulosic materials, he said.

Prof. Bilgrami felt that despite popularity and demand or mushrooms in food industry, the choice of edible fungi was restricted to *Agaricus, Volvariella, Pleuroteus* and *Morchella* only. He however further felt that cultivation and propagation of *Morchella* on large scale deserved priority.

The achievements of microbial biotechnology had been very impressive and it was an area with enormous potential for future, Prof. Bilgrami concluded.

Delivering the valedictory address, Prof. G.M. Reddy, Director, Centre for Plant and Molecular Biology (CPMB) of Osmania University, elaborated the role of genetic engineering and microbial mediated biotechnological aspects in developing new varieties, new clones, synthetic seeds, disease resistant varieties and economically viable and sustainable cultivers which could take care of human food and solve the problems of protein hunger.

Prof. Reddy said that the role of money was secondary in research and added that the vital factor was the researchers' willpower to become something in the field of science and technology. He advised the young scientists to implement the microbial biotechnology through skilful procedures and transfer the results from the laboratory to the land.

Prof. Reddy explained how crops and high yielding varieties of rice, banana and other crops could be developed through protoplast fusion and transferred to field. He said that it had yielded excellent results in his laboratory at CPMB of Osmania University.

Prof. Dinker Sirdeshmukh, Dean, College Development Council of Kakatiya University and President of the Warangal Regional Centre of A.P. Akademi of Sciences, referred to the importance of Microbial Biotechnology and complimented the department of Botany for successfully organising the symposium which had brought together eminent scientists from all over the country.

In the plenary session the following resolutions were adopted:

1. A national network for database related to microbes and their biotechnological application should be established to provide reliable and relevant help in teaching, research and extension.

2. There is an urgent need to strengthen the funding for the following thrust areas of microbiology and microbial technology :

a) Biodiversity of bacteria, fungi actinomycetes, algae, lichens, viruses etc. (taxonomic and culture collection);

b) Field implementation of mycorrhizal and biofertilisers technology and sustainability;

c) Energy production by biomass fermentation;

d) Biotransformation of some of the vital drugs and chemicals of biological importance; and

e) Development and formulation of biopesticides which are least health hazardous and effective plant protectants.

3. In view of new dimensions, it is essential to encourage the opening of the Department of Microbiology or Microbial Biotechnology both at the postgraduate and undergraduate and at the university and college levels for strengthening the teaching, research and technology. Adequate funds be provided.

Over 250 scientists from different universities and research organisations participated in the symposium at which as many as 85 papers were presented on various aspects of Microbial Biotechnology viz. Mycorrhizae, Soil Biology and Fertility; Plant Microbe Interaction, Tissue Culture in Plant Pathology, Post-harvest Technology and Mycotoxins; Microbes in Rural Development and Fermentation Technology, Microbial Genetics and Strain Improvement, Biomass Production and Mushroom cultivation.

ERN Services at Poona Varsity

The University of Poona becomes the first university in the country to join the "global highway" of communication technology with the inauguration of educational research network (ERN) by the University Grants Commission (UGC) chairman, Prof. G. Ram Reddy recently.

The ERN with the help of the Indian University Centre for Astronomy and Astrophysics (IUCAA) will be directly connected through "Ernet" to the global network, "Inter-net". This facility will give the university direct access to 20 million registered users, namely, libraries, individual research centres (other than classified centres) spread all over the globe.

The vice-chancellor of the university, Mr S.C. Gupte, said that this facility "will make the university leap forward into the 21st century". He said this was the first phase of total computerisation of the university administration.

The university also plans to extend the ERN services with the help of the Centre for Development of Advanced Computing (CDAC). "We plan to instal a dish antenna shortly for this purpose," Mr Gupte said. According to him, this will open a wide vista for training of personnel among Indian Universities.

Computer Applications in Social Sciences

The Centre for Social Studies, Surat, proposes to organise a training course in 'Computer Applications in Social Sciences' from January 16-25, 1995. Sponsored by ICSSR, New Delhi, the course is meant for those who are engaged in survey research and have to deal with data processing and analysis. The course aims at exposing the participants to computer processing, fundamentals of computers, basic requirements of proper processing of data and to give a general idea about the organisation and quantification of data and statistical methods. Knowledge of basic statistical method is essential.

The course contents include (1) Introduction to Computer, its structure and input-output devices, general guidelines on hardware selection, various input/output mediums; (2) Survey research and Codification of data, its advantages and limitations; (3) Transfer of coded data to input mediums, data retrieval; (4) Introduction to PC software (5) Making use of computer analysis; (6) Statistical techniques; and (7) Use of SPSS (Statistical Package for Social Sciences).

Further details may be obtained from the Course Director, Centre for Social Studies, South Gujarat University Campus, Udhna Magdalla Road, Surat - 395 007.

ICORG-94

The Jawaharlal Nehru Technological University, Hyderabad, proposes to organise an International Conference on Remote Sensing and GIS (ICORG-94) on December 3-6,1994.

The Focal Theme of the conference is Remote Sensing and GIS for Environmental Planning. Papers proposed to be presented and discussed at the conference include Satellite Oceanography, Integrated Surveys, GIS, Applied Remote Sensing, Digital Image Processing, and Digital Cartography.

Panel Discussion on "Education, Training and Curriculum Development in GIS" will be arranged during ICORG-94. Tutorials on Geographic Information Systems are also proposed to be organised and the focus would be on Principles of Geographic

Information Systems, GIS for Environmental Impact Assessment, and GIS for Cadastral Surveys.

An exhibition by Manufacturers, Service Companies and other commercial Enterprises is also proposed to be organised for the display of Remote Sensing data interpretation equipment, Peripherals, Computer Hardware and Software products, Photoprocessing equipment, Photogrammetric and Satellite data interpretation equipment.

SENFE at Punjabi Varsity

Students, research scholars and teachers of Punjabi University are reported to have formed the Society to Ensure a Noise-Free Environment (SENFE).

SENFE has decided to launch an awareness drive to educate the people about the hazards and damages of increasing noise in a social environment.

The society has issued a handout outlining the fact that noise is an environmental air pollutant and is a health hazard. Repeated exposure to high-decible sounds destroy hear cells of the inner ear, causing deterioration of hearing and leading to deafness.

Among children, noise, in addition to hearing damage, also causes neurophysiological reactions affecting proper physical and mental development. Noise also causes emotional stress, disturbance in sleep, rise in serum cholestrol levels, blood pressure and heart problems. Noise can upset the digestive system and cause stress ulcers, inordinate dilation of pupils leading to colour blindness, debilitation of limb muscles and the spine, leading to headaches and loss of memory. Noise causes annoyance which damages family bonds and affects efficiency in office, studies and sports. All this eventually hampers the progress of the nation as a whole.

Shivaji Chair in Defence Studies

The then Chief of Army, late Gen. B.C. Joshi called for greater interaction between the military and academic institutions in the country and offered all possible help from the army for the purpose. He was speaking after he was felicitated by Poona University during the All-India vice chancellor's conference held recently. The then army chief was honoured for his support for instituting the Chhatrapati Shivaji chair at the department of defence studies at the university. He was presented with a memento by University Grants Commission chairman, Prof. G. Ram Reddy.

Stressing the need for more institutional support to defence studies all over the country, late Gen. Joshi suggested that the study of China and Pakistan in particular should be carried out in an "institutionalised manner".

Late Gen. Joshi, while complimenting the university for taking initiative in setting up the Shivaji chair, said if one hundred such chairs were instituted in other universities in the country, the army would support it.

News from Agricultural Universities

Plant Pathologists Meet

Dr. S. Arya, Vice-Chancellor, Chaudhury Charan Singh Haryana Agricultural University (CCSHAU) called upon the farm scientists to devise means other than chemical methods to contain various plant diseases on priority basis. He said such methods would not only be cost effective but also safe to human and cattle population as well as environment. He was inaugurating the two-day Annual Conference of Indian Phytopathological Society (North Zone) and Indian Society of Plant Pathologists in the CCSHAU recently.

Addressing the Plant Pathologists, Dr. Arya said that various diseases of important crops like wheat, rice, cotton as also of fruits and vegetables needed priority attention of the plant pathologists. He said leaf blights in wheat, leaf curl of cotton, blast disease of rice and red rot of sugarcane continued to be a challenge to the agricultural scientists.

Dr. Arya impressed upon the need of developing disease resistant varieties in active collaboration of the experts of other disciplines like plant breeders.

Dr. D. Suryanarayana, an eminent plant pathologist, in his keynote address said that scientists in an agricultural university should identify the problems of their respective areas first and then chalk out a line of action accordingly keeping the allocation of budget in view which was always limited. He also emphasised for coming out with cost effective and environment friendly solution to control plant diseases.

Over 200 plant pathologists from all over India participated in the conference.

Research Centre for Plant Protection

The Lal Bhadur Shastri Centre for Advanced Research in Plant Biotechnology and Plant Protection at the Indian Agricultural Research Institute was recently inaugurated by the Agriculture Minister, Dr Bal Ram Jakhar. The Centre will seek to deal with some of the challenges facing agricultural production in the country by employing novel techniques of plant molecular biology and biotechnology.

Speaking on the occasion the Agriculture Minister asked the scientists to develop newer techniques to meet the future requirements of the agriculture sector. He observed that Indian agricultural research had come a long way since the late 1960s, when India was a major importer of foodgrain.

The Minister cautioned that in applying techniques of biotechnology to improve agricultural production, scientists must also ensure that biodiversity was maintained.

For the first time, the country will have a centre for disinfestation of fruits, and to maintain the necessary phyto sanitary conditions for the export of fruits and vegetables. State-of-the-art equipment has been imported with the assistance of APEDA and the Ministry of Commerce to set up a vapour heat treatment system to destroy and control the fruit fly which infests many Indian fruits such as mango, papaya.

Biogas Convention at CCSHAU

The Convention of Biogas organisations was recently held at the Chaudhury Charan Singh Haryana Agricultural University (CCSHAU). Inaugurating the Convention Dr. S. Arya, Vice Chancellor of CCSHAU, stressed the need of popularising non-conventional energy sources use at faster pace. He said the use of biogas besides accentuating social benefits would also reduce pressure on forests which have been severed relentlessly for fire wood. He said this programme should be taken to the grassroot level and the rural women folk should be made aware of the uses of such plants.

Dr. Arya also disclosed that a Biogas Development and Training Centre established recently at the University under the aegis of Ministry of Non-Conventional Energy, Government of India would conduct need based research and design biogas plants as well as impart training to masses and functionaries of government and NGOs on non-conventional energy sources.

Speaking on the occasion, Dr. A.K. Dhussa, representative of the Non-Conventional Energy Ministry, said that keeping the number of farm animals in view, Haryana was a potential state for setting an exemplary number of biogas plants. He disclosed that of the proposed target of three lac biogas plants only 26 thousand plants could have been installed till today in Haryana.

Dr. A.S. Faroda, Director of Extension Education, in his welcome address, outlined the mandate of the Regional Biogas Development and Training Centre. He assured the representatives of Ministry of Non-Conventional Energy Sources of all out help for effective implementation of this project in the state.

Over 150 experts from Ministry of Non-Conventional Energy Sources, State Department of Agriculture, scientists from agricultural universities, NGOs and voluntary organisations participated in the convention.

News from UGC

Countrywide Classroom Programme

Between 8th December to 22nd December, 1994, the following schedule of telecast on higher education through INSAT-ID under the auspices of the University Grants Commission will be observed. The programme is presented in two sets of one hour duration each every day from 6.00 a.m. to 7.00 a.m. and 1.00 p.m. to 2.00 p.m. The programme is available on the TV Network throughout the country.

Ist Transmission

6.00 a.m. to 7.00 a.m.

8.12.94

"Cheiloscopy - Part II"

"Selling Ideas and Selling Dreams - Part II"

"The Precious Casket"

10.12.94

"Riddles of the Heaven"

"Side Effects of Pesticides"

"The Indian Marine Pearls - Part II : Pear Culture"

11.12.94

"New Horizons"

"Science to the Rescue of Cultural Heritage"

"The Week Ahead"

13.12.94

"The Chip"

"Tropical Cyclone"

"Vaccine Production"

15.12.94

"Lab Safety"

"Women's Commission - Watchdog of Women's Rights"

"Nature of Teaching"

17.12.94

"Theories of Heaven"

"Problem Child"

"Blue Green Algae-Biofertilizers"

18.12.94

"Music and Moods - Part I"

"Treating Patients as Consumers : Consumer Protection Act"

"The Week Ahead"

20.12.94

"Question Time"

"Burning Bright - Sun – A Viable Energy Option"

"Triumph of Architecture"

22.12.94

"Lok Adalat - Part I"

"A Debate on Parliamentary Democracy"

IInd Transmission

1.00 p.m. to 2.00 p.m.

8.12.94

"Teletext"

"Sculptural Heritage of Kanchipuram"

"A World of English - Part VI: Group Discussion-II"

9.12.94

"New Horizons"

"Trinidad and Tobago - A Dialogue in Development"

10.12.94

"Programme on Management"

"Variations on America - Part I : Ragtime Era Compositions"

"The Week Ahead"

11.12.94

No Telecast

12.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

13.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

14.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

15.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

16.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

17.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

18.12.94

No Telecast

19.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

20.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

21.12.94

"Interactive Package on New Communication Technology" (*Live Telecast*)

22.12.94

"The Samanthas – An Anthropovision"

"The Insecteater"

"Health Communication : Obesity"

Hindi Telecast

प्रात: 6.00 से 6.30 बजे तक

9.12.94

"कबीर बानी – भाग 2"

"ईंधन बचाइये"

12.12.94

"राजस्थानी कृषि प्रगति की ओर"

"छोटी–छोटी बातें"

14.12.94

"समाचार पत्र की रचना प्रक्रिया"

"पोलियो"

16.12.94

"कबीर बानी – भाग 3"

"इट्स नेवर टू लेट"

19.12.94

"साक्षरता"

"कथा–व्यथा"

21.12.94

"रेवतीसरन शर्मा से इंतिजार हुसेन की बातचीत"

Guidelines for Research Projects

The University Grants Commission is reported to have issued new guidelines for undertaking research projects under its support for research scheme in various disciplines by permanent teachers in universities and colleges. According to the guidelines, the Commission will provide a maximum financial support of Rs 7 lakhs for undertaking major research projects in science, engineering and technology, while for humanities, social sciences and languages Rs 5 lakhs will be provided to permanent teachers having a Ph.D. degree.

A research project can be undertaken by an individual teacher or a group of teachers or by a Department as a whole.

The Commission will also consider inter-disciplinary research investigation and encourage joint projects with Departments in other universities. In case of a joint project, one of the teachers will function as a Principal Investigator and he will be responsible for all matters pertaining to the project.

Retired teachers, up to the age of 70 years, could also participate under the scheme. They will be eligible for an honorarium of Rs 3,000 per month.

A teacher seeking financial support under this scheme, is required to submit the research project to the UGC after the same has been scrutinized by a research committee consisting of at least two faculty members and one outside subject expert to be appointed by the head of the institution.

Project proposals will be considered by the Commission twice a year by March 31 and September 30 and the same would be decided by the Commission by April 30 and October 31 respectively.

The financial support will be given for items like equipment, books and journals, chemicals and consumables, hiring services, travel and field work and special need.

Appointment of a candidate as project associate could be made by an open selection and the project associate will be eligible for a salary of Rs 2,500 per month for the first two years and Rs 2,800 per month for the subsequent years. A Principal Investigator can also appoint a project fellow at a salary of Rs 1,800 per month.

According to the guidelines the duration of a project will be three years and the tenure is extendable up to five years on a year-to-year basis after taking prior approval of the Commission.

The Commission will provide financial assistance to permanent college teachers wishing to undertake a minor research project or an investigation for the doctorate degree.

A financial assistance will be Rs 40,000 in the fields of science, engineering and technology, while Rs 30,000 will be given for undertaking research in the field of humanities and social sciences.

For this facility, the college teacher will have to submit his research project to the UGC through his department or college and the proposal should be forwarded to the university to which the college is affiliated.

In this case, the duration of the project for all subjects will be two years and the tenure is extendable six months after taking prior approval of the Commission.

News from Abroad

Sanctions Against Quality Assessment Failure

University departments that fail any aspect of new quality assessment gradings will face funding council sanctions unless they can show an improvement within a year.

The Higher Education Funding Council for England (HEFCE) accepted plans for a graded scale of assessment under which departments will receive a mark on a one to four scale on each of six core aspects of provision.

If none of the core aspects is graded one (lowest) the department will be approved. If any receive a one the department will be judged inadequate and issued with a "yellow card" warning.

Assessors will revisit yellow card institutions within 12 months. Graeme Davies, chief executive of HEFCE, said: "We would expect that if they did not make the grade within the time available to them, the yellow card would develop into a red one with withdrawal in whole or part of their funding." The six core aspects to be assessed are :

- Curriculum design, content and organisation
- Teaching, learning and assessment
- Student progression and achievement
- Student support and guidance
- Learning resources
- Quality Assurance and Enhancement.

Professor Davies said it was likely that a numerical scale would be used. "It has so many advantages including paralleling the research selectivity exercise."

The new system, combined with the universal visiting arrangements agreed at the last meeting of HEFCE, will come into force for the assessment round between April 1995 and September 1996. The subjects to be assessed are chemical engineering, sociology, linguistics, French, German and related languages, Italian, Iberian languages and studies, and Russian and Eastern European languages and studies.

Professor Davies said this activity would carry the assessment process forward at a pace in line with its original target of working through the entire system in five years. The switch to universal visiting will inevitably increase the volume of work.

We Congratulate...

Dr. Vachaspati Upadhyaya who has taken over as Vice-Chancellor of Shri Lal Bahadur Shastri Rashtriya Sanskrit Vidyapeeth, New Delhi.

Indira Gandhi National Open University

Schedule of Telecast for the period 1 December to 31 December, 1994
6.30 a.m. to 7.00 a.m.

Date/Day	Academic Programme	Title
2.12.94 Friday	Management	Indian Socio-economic Scenario
5.12.94 Monday	Bachelor's Degree Programme	Nautral Selection in Action
7.12.94 Wednesday	Rural Development	Kabiley
9.12.94 Friday	Management	Developing a National Level Advertising Campaign
12 12.94 Monday	Bachelor's Degree Programme	Shahri Mazdoor
14.12.94 Wednesday	Nutrition and Health Edu.	Incidence and Management of Nutrition Deficiency Disorders
16.12.94 Friday	Management	New Product Launch
19.12.94 Monday	Bachelor's Degree Programme	Training of Higher Civil Servants
21.12.94 Wednesday	Bachelor's Degree in Nursing	1. Sterilisation and Disinfection 2. Open Channel
23.12.94 Friday	Management	Computers and O.R.
26.12.94 Monday	Bachelor's Degree Programme	State and Weaker Sections
28.12.94 Wednesday	Computers in Office Mgt.	History of Computers
30.12.94 Friday	Management	Problem Solving

BOOK REVIEW

Of Limited Value

Pushpa Dhyani*

K.G. Adiyodi, Ed. New Frontiers of Knowledge : University of Calicut 1968-1993. Calicut, University of Calicut, 1993. Pp. 636. Rs. 600.00.

New Frontiers of Knowledge is 25 years' record of publications and research activities of the teachers and research scholars of the University of Calicut and its affiliated colleges. The book has been edited by Dr K.G. Adiyodi in connection with silver jubilee celebrations of the University which has completed its 25 years in 1993. The book presents a vivid picture of the academic pursuits of the teachers and research scholars of the university departments, affiliated colleges, and the recognised research centres. The University has 13 Faculties with about 30 departments. The book has listed 6,045 publications and 474 doctoral theses produced during 1963-93. The Editor of this work, Dr. A.G. Adiyodi, is Professor of Reproductive Physiology in the Department of Zoology and credit must be given to him for collecting, arranging and analysing the necessary data extensively and elaborately.

The book is divided into five chapters. The author and subject indexes are also given at the end.

Chapter 1 designated as *Publications* enumerates 6,045 publications covering 445 pages of the book. The entries of publications are arranged alphabetically author-wise, with other information—name of editors and publishers it is a book; name of journal, volume number etc, if it is an article. The chapter is divided Faculty-wise under which the publications of related departments are enlisted.

Chapter 2 gives the names of various all India *Research Centres* recognised by University of Calicut.

Chapter 3 entitled '*They Guide and Supervise Research*' covers pages 450-471. It informs about the parent departments and home addresses of Ph.D supervisors of the University of Calicut — some of whom have either retired or left the university to join somewhere else or some have even expired. In a priced publication for wider circulation such information is inappropriate, when the name and department of the supervisor is repeated in Chapter 4.

In Chapter 4 — *Doctorates* — Ph.Ds produced by different departments during all these 25 years have been enlisted.

In Chapter 5 the information covered in Chapters 1 to 4 have been analysed and evaluated. With the help of tables and diagrammes each item has been X-rayed from various angles. For example, Table 1 gives the minute details about the publications and doctoral theses of all the faculties of the University of Calicut, whereas in Tables 2 to 6 this information is described department-wise. Tables 7 to 12 indicate the total number of publications of different faculties and their departments. Table 13 enlists the journals and books of the university teachers which have been published by international publishers, etc. However, out of 15 publications enlisted in this table 9 are edited books and one is a periodical publication. The books numbered 6 to 13 are 6 volumes of one and the same book and are edited by K.G. Adiyodi and R.G. Adiyodi. Moreover, the academic excellence and quality of a publication cannot be adjudged merely because it has been published by an international agency, more important is the thought content of the book.

In all, there are 42 tables and 37 graphs in this chapter to pinpoint and analyse the publications and doctoral theses under various headings, such as: Performance by Faculties; Number and type of publications; Flow charts of performance; publications-to-theses ratio; Authorship pattern of publications, etc. All this exercise perhaps, may have some relevance to the University of Calicut which it may utilise as a cover for getting grants and financial assistance from central or state govts, UGC and other such agencies.

Assoc. Professor, Department of Library and Information Science, University of Rajasthan, Jaipur.

The universities are basically the centres of higher learning and research. Any piece of research work and item of new knowledge produced by the academic community must, therefore, be communicated to those to whom it is beneficial in further pursuit of research. For this purpose various institutions, organisations and agencies at national and international levels have been established. These agencies are providing various indexing and abstracting services to keep the research scholars abreast of current as well as retrospective literature published in their respective fields of interest. Few such services are: Biological Abstracts (Philadelphia); Chemical Abstracts (American Chemical Society); Indian Science Abstracts (Delhi), etc. In this context, the publication under review has the following limitations :

1. this presents publications of one single university, whereas national and international bibliographical tools prepared for varied specific disciplines and subjects are already available in which all current literature enumerated systematically and comprehensively;

2. this type of publication is useful if published at regular intervals, but it seems to be a one time affair only.

Insofar as the arrangement of data included in the book is concerned, it lacks expert guidance. The library and information scientists who are specialists in the methods and techniques of preparing bibliographical tools should have been involved in a work, which perhaps is intended to focus the academic image of the university to outside world. In the absence of such an expert advice the haphazard arrangement of faculties in Chapter 1 is conspicuous; at least alphabetical arrangement should have been followed as in Chapter 4.

It would have been useful if the code words for conference proceedings, reviews, reports were used and indicated in brackets at the end of entries in Chapter 1 *Publications*. The list of affiliated colleges should have also been given in Chapter 2. It would have been more appropriate if each college would have been given a code word for inclusion in Chapters 1 and 4 to specify the works of college teachers. Likewise in Chapter 4—*Doctorates* the titles of Ph.D works do not indicate the language in which these are written. In languages like Sanskrit, Hindi, Tamil, Arabic, etc some of the candidates may have written their Ph.D work in the specific language itself. The language in which the theses is written should have also been indicated to facilitate its use by uses of other universities and institutions.

Technological Colonialism

(*Contd. from page 17*)

time in a row. The Board of Student Welfare arranged 150 jobs in the summer-93 and 60 jobs in the winter-93. The students were able to make use of this facility to have practical experience under the guidance of the faculty on specific jobs besides meeting their part financial requirements.

The Board for Student Publications provides opportunity to enhance the creative and journalistic interest of the students by bringing two English (*Pulse and Contact*) and two Hindi (*Vatayan and Pratibimb*) magazines every year in addition to a fortnightly campus newsletter.

NCC has organised a 5-day camp to Kotdwar/Landsdowne. In addition to the Republic Day parade, they also organised a cycling trip from Delhi to Agra and back.

The NSS in collaboration with the Blood Bank of the Indian Red Cross Society, organised three blood donation camps in which 778 units of blood was donated by the voluntary donors. About one van full of relief material (clothes) was given to the victims of earthquake in Maharashtra through Gandhi Peace Foundation.

In order to encourage innovations to help us surge ahead of all our peers, the Board for Hostel Management has instituted trophy for innovation in Hostel organisation to recognise the technical skill of the students for improving the general life in the campus. In this direction, the innovation trophy was awarded to a project on recommissioning the solar water heater system.

The All India Student Seminar in Science & Technology TRYST'94 was organised by the Academic Interaction Council, with about 100 undergraduate students from engineering institutions all over the country participating to present scientific and technical papers. A journal including award winning papers and abstracts of other presentations, has been published for wider circulation.

RESEARCH IN PROGRESS

A list of research scholars registered for doctoral degrees in Indian Universities

SOCIAL SCIENCES

Library & Information Science

1. Chaturvedi, Vikas. **Use of information sources in Government Department concerned with planning in India.** BHU. Prof Y P Dubey, Department of Library and Information Science, Banaras Hindu University, Varanasi.

Psychology

1. Guy-De-Fortgalland. **A study on coaching effectiveness and its psychological correlates.** Panjab. Prof Jitendra Mohan, Department of Psychology, Panjab University, Chandigarh.

2. Modgil, Vandana. **A study of loneliness in mid adolescence in relation to negative cognition, personality and social network.** Panjab. Dr V V Upmanyu, Department of Psychology, Panjab University, Chandigarh.

3. Saini, Aditi. **Psychosocial correlates of effectiveness among judicial officers.** Panjab. Dr Meena Sehgal, Department of Psychology, Panjab University, Chandigarh.

Sociology

1. Chadha, Asha. **Parivartan evam punrajagaran ke sandarbh mein Swami Vivekanand ke samajik vicharon ka samajik adhyayan.** BHU. Dr K D Dwivedi, Department of Sociology, Banaras Hindu University, Varanasi.

2. Khandelwal, Indira. **A sociological study of library renaissance.** BHU. Dr A K Kaul, Department of Sociology, Banaras Hindu University, Varanasi.

3. Sandipa. **Social burden on family of alcoholic depend person medium class family.** BHU. Dr K P Shukla, Department of Preventive and Social Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

Political Science

1. Jolly, Ruby. **Lala Lajpat Rai and the Indian national movement.** Panjab. Prof T R Sharma, Department of Political Science, Panjab University, Chandigarh.

2. Srivastava, Chandra Shekhar. **Janta Party and its socio-economic programme : A study of the legislative actions in the UP Legislative Assembly, 1977-79.** BHU. Dr A S Mishra, Department of Political Science, Banaras Hindu University, Varanasi.

Economics

1. Alavinasab, Seyed Mohammad. **Industrial development in Uttar Pradesh.** BHU. Prof P K Bhargava, Department of Economics, Banaras Hindu University, Varanasi.

2. Azhar Hasib, **Developmental expenditure in Uttar Pradesh.** BHU. Dr (Mrs) M Srivastava, Department of Economics, Banaras Hindu University, Varanasi.

3. Bhattacharya, Debshree. **US's trade relations with SAARC.** BHU. Prof G S Kushwaha, Department of Economics, Banaras Hindu University, Varanasi.

4. Dharmaja, S H S. **Model for stock levels of different types of yarn for the production of a mix of fabrics in textile industry.** Kerala. Prof S Chidambara Iyer, B-7, Jawahar Nagar, Trivandrum.

5. Pandey, Ravi Shanker. **Poverty alleviation progresses : A case study of Vidyapeeth Block, Varanasi.** BHU. Dr (Mrs) M Srivastava, Department of Economics, Banaras Hindu University, Varanasi.

6. Raj Kumar. **Population pressure, economic growth and human development : Inter-state variations in India, 1961-91.** Panjab. Dr A C Julka, Department of Economics, Panjab University, Chandigarh.

7. Sengupta, Madhuchhanda. **Economics of basic education in India.** BHU. Prof G D Mishra, Department of Economics, Banaras Hindu University, Varanasi.

8. Shrestha, Bijaya. **Inter-relationship between population and agriculture: Nepalese experiences.** BHU. Prof U K Mehra, Department of Economics, Banaras Hindu University, Varanasi.

9. Shrestha, Pushpa. **Tourism in Nepal : Problems and prospects.** BHU. Prof U K Mehra, Department of Economics, Banaras Hindu University, Varanasi.

10. Singh, Harsh Vardhan. **Industrial sector reforms in India.** BHU. Dr (Mrs) M Srivastava, Department of Economics, Banaras Hindu University, Varanasi.

11. Sood, Vibha. **Socio-economic inequalities among Gaddi households in Himachal Pradesh: A study of Kangra District.** HP. Dr K C Sharma, Department of Economics, Himachal Pradesh University, Shimla.

12. Tiwari, Ashok Kumar. **Socio-economic infrastructure and level of economic development: A disaggregated study of Himachal Pradesh.** HP. Dr H S Parmar, Department of Economics, Himachal Pradesh University, Shimla

Law

1. Srivastava, Awadhesh Bihari Lal. **Bharat ke Samvidhan ke antargat mahilayon ka sanrakshan : Ek alochanatmak vishleshan.** BHU. Dr G P Verma, Law School, Department of Law, Banaras Hindu University, Varanasi.

Public Administration

1. Gurvinder Kaur, **Public enterprise reforms in India: A case study of National Fertilizers Limited, NFL.** Panjab. Dr B S Ghuman, Department of Public Administration, Panjab University, Chandigarh.

Education

1. Sat Pal Kaur. **Participation of women in sports as related to birth-order, socio-economic status, family sports environment and parental attitude.** Panjab. Prof (Miss) J Bhullar, Department of Physical Education, Panjab University, Chandigarh.

2. Singh, Dharam Pal. **Voluntary organisations in Rajasthan and the impact of their educational programmes.** Sukhadia. Prof A P Sharma, (Retd), Department of Education, Vidya Bhawan Teachers' College, Udaipur.

Commerce

1. Anandan, G.S. **Role of training in enhancing effectiveness of personnel in banks.** Panjab. Dr B S Ghuman, Department of Public Administration, Panjab University, Chandigarh and Dr C S Vaidya, Department of Commerce and Business Management, Panjab University, Chandigarh.

2. Banarjee, Bhaskar. **Financial costing in municipal bodies in India : Case study.** BHU. Dr K N Sharma, Department of Commerce, Banaras Hindu University, Varanasi.

3. Chakrabarti, Subhrajyoti. **Practices and system of accounting in Calcutta Corporation.** BHU. Dr D S Mishra, Department of Commerce, Banaras Hindu University, Varanasi.

4. Dwivedi, Surendra Kumar. **Corporate reporting practices in India : A case study.** BHU. Dr S P Srivastava, Department of Commerce, Banaras Hindu University, Varanasi.

5. Eiad Basher Abeed Alkareem Debee. **Institutional assistance to small scale industries : A case study.** BHU. Dr M N A Ansari, Department of Commerce, Banaras Hindu University, Varanasi.

6. Mishra, Sanjay Kumar. **Marketing practices in small scale and cottage industries in Varanasi.** BHU. Dr S B Rai, Department of Commerce, Banaras Hindu University, Varanasi.

7. Mishra, Surya Nath. **Cement industries in Nepal : An appraisal of its financial performance.** BHU. Dr B Jha, Department of Commerce, Banaras Hindu University, Varanasi.

8. Sharma, Dinesh Kumar. **Rationale of privatisation in banking industries in India : An appraisal.** BHU. Dr K N Sharma, Department of Commerce, Banaras Hindu University, Varanasi.

9. Singh, Rajnish Kumar. **Minerals and Metal Trading Corporation : Study of its marketing functions.** BHU. Dr S B Rai, Department of Commerce, Banaras Hindu University, Varanasi.

10. Srivastava, Niraj Kumar. **Internal audit system : A case study of Banaras Hindu University.** BHU. Dr Prashant Kumar, Department of Commerce, Banaras Hindu University, Varanasi.

11. Upadhyay, Surya Prakash. **Performance appraisal of Uttar Pradesh Electricity Board.** BHU. Dr S P Agrawal, Department of Commerce, Banaras Hindu University, Varanasi.

Home Science

1. Khorana, Poonam. **A study of scientific temperament among school going girls and their teachers of Varanasi Distt.** BHU. Dr (Mrs) P Srivastava, Department of Home Science, Banaras Hindu University, Varanasi.

2. Sashi. **Health status of primary school children in relation to their mothers knowledge and adoption behaviour.** BHU. Dr I Bishnoi, Department of Home Science, Banaras Hindu University, Varanasi.

Management

1. Mathur, Shubhendu Prakash. **Resource mobilisation by central universities : A case study.** BHU. Dr Chhote Lal, Department of Management Studies, Banaras Hindu University, Varanasi.

2. Shukla, Alok. **Project exports from India: A case study.** BHU. Dr H C Chaudhary, Department of Management Studies, Banaras Hindu University, Varanasi.

3. Srivastava, Priyanka Kumari. **Productivity as a function of job satisfaction, job involvement and values in Indian corporate sector: A case study.** BHU. Dr S K Singh, Department of Management Studies, Banaras Hindu University, Varanasi.

HUMANITIES

Philosophy

1. Anupama Kumari, **Dr Bhagwan Das ka dharmik evam darshanik vicharon ka sameekshatmak adhyayan.** BHU. Dr S Vijay Kumar, Department of Philosophy and Religion, Banaras Hindu University, Varanasi.

2. Chayapanno, Phramaha Panya. **An analytical study of the Bodhisattva ideal in Mahayana Buddhism.** BHU. Dr U C Dubey, Department of Philosophy, Banaras Hindu University, Varanasi.

3. Chitra, **Samakaleen Bhartiya darshan.** BHU. Dr Munni Rani Agrawal, Department of Philosophy and Religion, Banaras Hindu University, Varanasi.

4. Mahesh Ranjan, **Sankhya evam Shaiva siddhanta ka atma kee avadharana ka sameekshatmak adhyayan.** BHU. Dr Urmila Chaturvedi, Department of Philosophy and Religion, Banaras Hindu University, Varanasi.

5. Mishra, Pramod Kumar. **Shankar evam Vivekanand ke anusar Ishwar kee avadharana ka sameekshatmak adhyayan.** BHU. Dr K P Mishra, Department of Philosophy and Religion, Banaras Hindu University, Varanasi.

6. Singh, Archna. **M N Roy's philosophy of new humanism: An analytical study.** BHU. Dr D A Gangadhar, Department of Philosophy and Religion, Banaras Hindu University, Varanasi.

7. Srivastava, Archana. **Vaishnav darshanon mein mayavad ke khandan ka ek sameekshatmak adhyayan.** BHU. Dr Urmila Chaturvedi, Department of Philosophy and Religion, Banaras Hindu University, Varanasi.

8. Taruno, Phramaha Grissana. **The concept of suffering in Theravada Buddhism : An analytical study.** BHU. Dr D A Gangadhar, Department of Philosophy, Banaras Hindu University, Varanasi.

9. Thanavaro, Phramaha Tawee. **The role of Buddhist ethics in the preservation and development of the environment.** BHU. Dr D A Gangadhar, Department of Philosophy, Banaras Hindu University, Varanasi.

Fine Arts

1. Singh, Sudhir Kumar. **Ghazipur Janpad kee aitihasik kothiyan evam anya vastu.** BHU. Dr D B Pandey, Department of History of Art, Banaras Hindu University, Varanasi.

Plastic Art

1. Bhartiya, Radhe Shyam. **Gupta kaleen Bharatiya murtikala ke alankaran tatva.** BHU. Shri P Chandervinod, Department of Plastic Arts, Banaras Hindu University, Varanasi.

2. Ram, Balchand. **Bisvin shatabdi kee Bharatiya murtikala kee do vishista dharao, Pashchatya academic shaili se prabhavit aur maulik adhunik shaili ka tulnatmak vishleshan.** BHU. Prof B S Katt, Department of Plastic Arts, Banaras Hindu University, Varanasi.

3 Singh, Mamta. **Karyashala mein karyarata samkaleen Bharatiya adhunik mrit-patra shilpi aur unke kanchiya pralepit patro mein yogdan.** BHU. Dr A Chakravarti, Department of History of Arts, Banaras Hindu University, Varanasi.

4. Sudhir Kumar, **Bharatiya mrinamya patro ka kritim vikas.** BHU. Dr Bhanu Agrawal, Department of History of Arts, Banaras Hindu University, Varanasi.

Graphic Art

1. Bindu, **Grameen kshetron mein vigyapan madhyamon ka prabhav.** BHU. Shri H L Prajapati, Department of Applied Arts, Banaras Hindu University, Varanasi.

2. Yadav, Vijay Kumar. **Development of graphical design: Its influence on Indian advertising.** BHU. Shri Vijay Singh, Department of Applied Arts, Banaras Hindu University, Varanasi.

Music

1 Sashi Kumar, K. **A study of improvisation, anibaddha in Karnatik music and Hindustani music.** BHU. Prof R D Chakravarty, Department of Instrumental Music, Banaras Hindu University, Varanasi.

LANGUAGE & LITERATURE

English

1. Gautam, Shridhar. **Changing perspectives of social reality in the novels of Mulk Raj Anand.** BHU. Dr M S Pandey, Department of English, Banaras Hindu University, Varanasi.

2. Gupta, Abha. **A comparative study of contemporary Indian drama in English and Indian languages.** BHU. Dr S R Jalote, Department of English, Banaras Hindu University, Varanasi.

3. Kamal, Taj Prasad. **Instrument of socio-cultural realities in V S Naipaul.** BHU. Dr R K Shukla, Department of English, Banaras Hindu University, Varanasi.

4. Rout, Puspamitra. **The poetry of Keats: A reassessment in the light of modern criticism.** BHU. Prof R S Sharma, Department of English, Banaras Hindu University, Varanasi.

5. Roy, Madhumita. **Class, race and gender in the fiction of Toni Morrison.** BHU. Dr V Tripathi, Department of English, Banaras Hindu University, Varanasi.

6. Sanadhya, Govind Prasad. **Milton's Paradise Lost: A study in politics of dispossession.** BHU. Dr A Biswas, Department of English, Banaras Hindu University, Varanasi.

7. Sharma, Gajab Kumari. **Feminist concerns in the novels of Wille Cather.** BHU. Dr Sushila Singh, Department of English, Banaras Hindu University, Varanasi.

8. Shukla, Suman. **Short stories of Ruskin Bond: A critical study.** BHU. Dr Meena Sodhi, Department of English, Banaras Hindu University, Varanasi.

9. Singh, Vijay Pratap. **Sri Aurobindo as a poetic dramatist.** BHU. Dr H Swaroop, Department of English, Banaras Hindu University, Varanasi.

10. Upadhyay, Priya. **Kamla Markandaya: Feminist concerns in her novels.** BHU. Dr R K Shukla, Department of English, Banaras Hindu University, Varanasi.

German

1. Tripathi, Munindra. **Tendenzen der Erzahlliteratur ab 1945 in der Deutschen und Indischen literature: Eine kritische bewertung.** BHU. Prof S N Upadhyay and Dr Indu Bhave, Department of German Studies, Banaras Hindu University, Varanasi.

Sanskrit

1. Mishra Pramod Kumar. **Dhanpran krit Shataktraya ka sameekshatmak adhyayan.** H S Gour. Dr Bal Shastri, Department of Sanskrit, Dr Hari Singh Gour Vishwavidyalaya, Sagar.

2. Sharma, Dharam Paul. **Pratapa-Rudra Deva krit Sarasvati Vilasa ke vishesh sandarbha mein dharma shastriya vyavahara vishayon ka alochnatmaka adhyayana.** Panjab. Dr V P Upadhyaya, Department of Sanskrit, Panjab University, Chandigarh.

Pali

1. Paungtanee, Phramaha Vichan. **Analytical study of the Mangala-Sutta with reference to Thai society.** BHU. Dr H S Shukla, Department of Pali and Buddhist Studies, Banaras Hindu University, Varanasi.

Punjabi

1. Balwinder Singh, **Puadh dee Punjabi sahit nun den.** Panjab. Dr Deepak Manmohan Singh, School of Punjabi Studies, Panjab University, Chandigarh.

2. Dev Inder Singh, **Scientific approach to the study of Gurbani.** Panjab. Dr Darshan Singh, Department of Guru Nanak Sikh Studies, Panjab University, Chandigarh.

3. Jaspal Kaur, **1975 ton bad de Punjabi natak ate rangmanch vich naven paryog.** Panjab. Dr Raghbir Singh, School of Punjabi Studies, Panjab University, Chandigarh.

4. Kamaljit Kaur, **Desh-vand ton bad de Punjabi nibandh-sahit da tulnatmak adhyayan.** Panjab. Dr Deepak Manmohan Singh, School of Punjabi Studies, Panjab University, Chandigarh.

5. Kamaljit Kaur. **1980 ton bad dee Punjabi kahani vich sanskritik tanaon da adhyayan.** Panjab. Dr Deepak Manmohan Singh, School of Punjabi Studies, Panjab University, Chandigarh.

6. Sukhwinder Singh, **Pash dee vichardhara ate kav-drishti.** Panjab. Dr Jagjit Singh, School of Punjabi Studies, Panjab University, Chandigarh.

7. Sulekha, **Canadian Punjabi kahani vich parvas-anubahv.** Panjab. Dr Deepak Manmohan Singh, School of Punjabi Studies, Panjab University, Chandigarh.

8. Tirath Singh, **Gurbani te Punjabi Sufi kav da tulnatmak adhyayan.** Panjab. Dr Darshan Singh, Department of Guru Nanak Sikh Studies, Panjab University, Chandigarh.

9. Yodha Singh, **Unniwin sadi de Punjabi kissa-kav dian birtant-vidhiyan.** Panjab. Dr Jagjit Singh, School of Punjabi Studies, Panjab University, Chandigarh.

Hindi

1. Lalita Rani. **Agyeya kee mool chetna : Antah prakriyaon ke sandarbh mein.** Panjab. Dr Paresh, Department of Hindi, Panjab University, Chandigarh.

2. Parminder Singh, **Ramesh Bakshi kee kahaniyan: Vastu aur shilp.** Panjab. Dr Paresh, Department of Hindi, Panjab University, Chandigarh.

3. Partap Singh, **Sant kavya mein samajik chetna.** Panjab. Dr R D Singhal, Department of Hindi, Panjab University, Chandigarh.

4. Sharma, Suresh Kumar. **Harinam krit Ramashavmegh ka kavya saahtriya adhyayan.** Panjab. Dr Balraj Sharma, Department of Hindi, Panjab University, Chandigarh.

Urdu

1. Behl, Renu. **Ismat Chugtai ke afsanon ka fanni wa fikri jaiza.** Panjab. Dr Haroon Ayub, Department of Urdu, Panjab University, Chandigarh.

2. Kalia, Kewal Krishan. **Ahwala Asar Mulana Mirza Altaf Hussain Sahib Alam Lukhnavi.** Panjab. Dr Madhukar Arya, Department of Urdu, Panjab University, Chandigarh.

3. Khan, Divan Salamuddin. **Bihar mein Urdu marsia.** BHU. Dr Qamar Jahan, Department of Urdu, Banaras Hindu University, Varanasi.

4. Khan, Taraq Saleem. **Allama Iqbal kee shairi mein qaumi va vatani tasauwarat.** Panjab. Dr Haroon Ayub, Department of Urdu, Panjab University, Chandigarh.

5. Umme Salma. **Urdu adab mein Ghazipur ka hissa.** BHU. Dr Qamar Jahan, Department of Urdu, Banaras Hindu University, Varanasi.

Nepali

1. Dabal, Gopal Prasad. **Kavi Laxmiprasad Davkotaka mahakavyama prayukta kathanak rudiharuko vishleshanatmak adhyayan.** BHU. Dr G S Nepal, Department of Indian Lanaguages (Nepali), Banaras Hindu University, Varanasi.

Kannada

1. Nadig, Vasudev. **Place names of Shimoga District in Karnataka : A toponygical and cultural study.** BHU. Prof V Shivanand, Department of Indian Languages (Kannada), Banaras Hindu University, Varanasi.

2. Patil, G S. **Vachanas and the Sufi songs : A comparative study.** BHU. Prof V Shivanand, Department of Indian Languages (Kannada), Banaras Hindu University, Varanasi.

3. Umeshappa, H. **Shimoga Filleya Nodalapayagulu : Ondu adhyayana.** BHU. Prof V Shivanand, Department of Indian Languages (Kannada), Banaras Hindu University, Varanasi.

Telugu

1. Venkata Ramana, Atluri. **Contribution of important Telugu personalities in the evolution of modern Telugu literary criticism.** BHU. Dr G Trivikramaiah, Department of Telugu, Banaras Hindu University, Varanasi.

Geography

1. Chatterjee, Anita. **Problems of working women in Kanpur City : A study in social geography.** BHU. Prof H H Singh, Department of Geography, Banaras Hindu University, Varanasi.

2. Johari, Gopal Kumar. **National Capital Regions : A comparative analysis of plan strategies at global level.** Panjab. Prof Gopal Krishan, Department of Geography, Panjab University, Chandigarh.

3. Manoj Kumar. **Bhadohi Janpad, UP, mein mrida evam jal sansadhanon per vikas ka prabhav : Ek bhougolik vishleshan.** BHU. Dr Ram Bilas, Department of Geography, Banaras Hindu University, Varanasi.

4. Mishra, Rajeshwar. **Purvi Uttar Pradesh mein swatantrayottar samajik evam sanstritik rupantaran : Ek Bhougolik adhyayan.** BHU. Dr B Dube, Department of Geography, Banaras Hindu University, Varanasi.

5. Rai, Arun Kumar. **Water balance and its bearing on agriculture in West Middle Ganga Plain, UP.** BHU. Dr B N Singh, Department of Geography, Banaras Hindu University, Varanasi.

6. Rai, Gayatri. **Spatial pattern of population in metropolitan centres of UP, 1971-91.** BHU. Dr K K Dube, Department of Geography, Banaras Hindu University, Varanasi.

7. Singh, Akhilesh Kumar. **Karchhana Tahsil, Allahabad kee krishi mein rupantaran van vikas karyakramon ka prabhav.** BHU. Dr (Mrs) M Agrawal, Department of Geography, Banaras Hindu University, Varanasi.

8. Singh, Ragini. **Population growth and sustainable de-**

velopment in Ghazipur District. BHU. Dr (Mrs) N Kaushik, Department of Geography, Banaras Hindu University, Varanasi.

9. Singh, Sanjeev Kumar. **Climatic characteristic of Baghelkhand Region.** BHU. Dr B N Singh, Department of Geography, Banaras Hindu University, Varanasi.

10. Sunita Kumari, **Landuse change in Chunar Tahsil.** BHU. Prof V R Singh, Department of Geography, Banaras Hindu University, Varanasi.

11. Upadhyay, Anand Bihari. **Samanvit gramin vikas : Ghosi Tehsil, Mau ka bhougolik adhyayan.** BHU. Dr Ram Bilas, Department of Geography, Banaras Hindu University, Varanasi.

History

1. Arvind Kumar. **Metals and coinage in Ancient India : A study in socio-economic perspective.** BHU. Prof H C Bharadwaj, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

2. Dixit, Namita **Prachin Afghanistan kee kala per Bharatiya prabhav.** BHU. Dr M S Shukla, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

3. Mishra, Nitya Nand **Prachin Bharat mein bhavan nirman samagri evam technik, 200 BC to AD 600.** BHU. Prof H C Bharadwaj, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

4 Misra, Kavita. **Prarambhik Bharatiya kala mein dhatu.** BHU. Dr (Mrs) Vitha Tripathi, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

5. Pandey, Ramesh Dutt. **Chandel kaleen abhilekhon se prapta samagri ka sanskritik adhyayan.** BHU. Prof P C Pant, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

6. Rai, Sudhir Kumar. **Prachin Bharat mein bhu-rajasva neeti aur kisan varg per prabhav, 5th sadi isvi se 12th sadi isvi tak : Abhilekhan per adharit ek adhyayan.** BHU. Prof Maheshwari Prasad, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

7. Shukla, Sushil Kumar. **Gupta kal mein vanaspatik sampada.** BHU. Prof H C Bharadwaj, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

8. Singh, Amar Nath. **Prachin Bharat mein nyaya vyavastha ka itihas prarambhik kal se barahavin isvi tak.** BHU. Prof P Singh, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

9. Srivastava, Dharmendra Kumar. **History of building technology in Ancient India from 3000 B C to 200 B C.** BHU. Prof H C Bharadwaj, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

10. Tiwari, Bhanu Prakash. **Garur puran : Ek adhyayan.** BHU. Dr Meena Lal, Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, Varanasi.

THESES OF THE MONTH

A list of doctoral theses accepted by Indian Universities

SOCIAL SCIENCES

Library & Information Science

1. Madhuri Devi, Thoidingjam **Study of the peculiarities of the names of North East Region of India for Cataloguing.** Manipur. Prof M R Kumbar, Ex-Librarian, Manipur University, Imphal.

Psychology

1. Jain, Smita. **Learning categories as a function of hysteroidism and field dependence.** Durgavati. Dr R K Gurnani, MIG-7, H B Colony, Near H P O, South Civil Lines, Jabalpur.

2. Jaswinder Singh. **Psychophysiological deficite related to attentional processes in frontal lobe lesions.** Bangalore. Dr C R Mukundan, Prof, National Institute of Mental Health and Neuro Sciences, Bangalore.

3. Sumaranjitha, L. **Correlates of unsubstantiated beliefs among first year college girl students : An analytical study.** Kerala. Dr Krishna Prasad Sreedhar, Department of Psychology, University of Kerala, Kariavattom.

4. Venkataswamy Reddy, M. **Cluster analytic approach in psychiatry with special reference to child psychiatry.** Bangalore. Dr V G Kaliaperumal, Department of Biostatistics, National Institute of Mental Health and Neuro Sciences, Bangalore.

Sociology

1. Kumari Jayageetha, P B. **A study of population re-distribution and human settlement in India.** Kerala. Dr K Krishna Kumari, Reader and Head, Department of Demography, University of Kerala, Kariavattom.

2. Mohanachandran Nair, P. **A study of the effect of unwanted births on birth rate.** Kerala. Dr R Ramkumar, Prof (Retd), J-1, Jawahar Nagar, Trivandrum.

3. Momin Jan. **Women, education and social change in Kashmir.** Jamia. Prof Mohini Anjum, Department of Sociology, Jamia Millia Islamia, New Delhi.

4. Peppin, S. **Factors influencing fisherman's health and well-being : A case study of Kanyakumari District.** JNU Dr K

R Nayar, Centre of Social Medicine and Community Health, Jawaharlal Nehru University, New Delhi.

5. Santhosh, S. **Population ageing in Kerala : Present and prospect.** Kerala. Dr P S Nair, Addl Director, Population Research Centre, University of Kerala, Kariavattom.

6. Shobhan, Pratibha. **Bhind Janpad ke lokgeet : Ek samajshastriya adhyayan.** Jiwaji. Dr M P Srivastava, Prof and Head, Department of Sociology, K R G College, Gwalior.

Political Science

1. Annamalai, V. **Formation and dynamics of power in rural areas : A study of a village in Tamil Nadu.** Hyderabad. Dr G Sudharshanam, Lecturer, Department of Political Science, University of Hyderabad, Hyderabad.

2. Nannan, Sukhwant Singh. **South Africa and United Kingdom : A study of economic and political relations, 1960-1990.** JNU. Prof Vijay Gupta, Centre for West Asian and African Studies, Jawaharlal Nehru University, New Delhi.

3. Pandey, Abha. **Tritiya varg karmachariyon mein prashasnik sambandhon ke adhar per varg chetna ka adhyayan aur karmachari sanghon kee rajniti ka prabhav : Raipur Jile ke vishesh sandarbh mein.** Ravishankar. Dr (Smt) Nisha Jha, Asstt Prof, Department of Political Science, Government DBDK College, Baloda Bazar, Raipur.

4. Pandey, Usha. **Bhartiya rajnitik pranali per Smt Indira Gandhi ka prabhav.** Durgavati. Dr S C Verma, Principal, Govt Tilak College, Katni.

5. Ranjana. **The locus standi, effectiveness and reliability of the Election Commission in the Indian political system.** Bihar. Dr D N Mallik, Prof and Head (Retd), Department of Political Science, Babasaheb Bhimrao Ambedkar Bihar University, Muzaffarpur.

Economics

1. Agrawal, Kunj Bihari. **Socio-economic study of industries : A comparative study of Madhya Pradesh vis-a-vis Maharashtra and Gujarat.** *D Litt.* Durgavati. Dr D K Sinha, Prof, G S College of Commerce and Economics, Jabalpur.

2. Ghosh Dastidar, Krishnendu. **On some aspects of oligopolistic behaviour : A game theoretic analysis.** JNU. Prof Anjan Mukherjee, Centre for Economic Studies and Planning, Jawaharlal Nehru University, New Delhi.

3. Guha Majumdar, Madhumita. **Impact of foreign aid in economic development : A case study of Karnataka.** Bangalore. Prof S N Nanjegowda, Department of Economics, Bangalore University, Bangalore.

4. Jain, Neeta Kumari. **Operations, problems and prospects of regional rural banks.** Dayanand.

5. Mangalagiri, Anjana. **U S investments and denationalization of Mexican economy.** JNU. Prof R Narayanan, Centre for American and West European Studies, Jawaharlal Nehru University, New Delhi.

6. Manjula Reddy, R. **Industrial policy : Development and dispersal of industries in Karnataka, 1956-88.** Bangalore. Dr A Kalappa, No 50, Shanthala, 10th Cross, West of Chord Road, II Stage, Rajajinagar, Bangalore.

7. Mohanasundaram, V. **A study of institutional credit to small borrowers in selected rural areas of Tamil Nadu.** Bangalore. Dr M Prahladachar, Prof, Rural Economics Unit, Institute for Socio-Economic Change, Bangalore.

8. Naunihal Singh. **International business strategy for India.** *D Litt.* Durgavati. Dr D Hazela, Prof (Retd), Department of Economics, Rani Durgavati Vishwavidyalaya, Jabalpur.

9. Rajasekharan, M. **Decision making process of farmers with respect to price and non-price factors in crop cultivation.** Bangalore. Dr V S Satyapriya, Assoc Prof, Institute for Socio-Economic Change, Bangalore.

10. Sharma, Vijay Kumar. **Impact of forest industries on tribal economy, Bilaspur-Division.** Ghasidas. Dr B Vishwakarma, Prof (Retd), 24/32, Civil Lines, Kasari Dah, Durg.

11. Shinde, Venkat Govindrao. **A study on impact of dairy development programmes on dairy farmers in Udgir Block of Latur District.** Marathwada Agri. Dr R R Kulkarni, Assoc Prof, Department of Agricultural Extension, College of Veterinary, Parbhani.

12. Uchikawa, Shuji. **India's foreign trade policies and the development of the textile industry.** JNU. Prof Prabhat Patnaik, Centre for Economic Studies and Planning, Jawaharlal Nehru University, New Delhi.

13. Venkata Subba Reddy, P. **Population growth and trends in labour force : A study of Rayalaseema Region of Andhra Pradesh.** Krishnadevaraya. Prof N Narayana, Department of Economics, Sri Krishnadevaraya University College, Anantapur.

14. Venkati. **Land transfers and alienation in tribal economy : A case study of two selected scheduled area villages of Adilabad District.** Hyderabad. Prof G Nanchariah, Reader, Department of Economics, University of Hyderabad, Hyderabad.

Law

1. Mirza, Mohtasham Ali. **Islamic law relating to maintenance of wife : A socio-legal study.** Kakatiya. Prof Ahmedullah Khan, Department of Law, P G College of Law, Osmania University, Hyderabad.

2. Mishra, Raja Ram. **Rewa ke nyaya prashasan per alochnatmak adhyayan.** Durgavati. Dr M A Qureshi, Department of Law, Rani Durgavati Vishwavidyalaya, Jabalpur.

3. Sunny, K C. **Corrupt practices in the Law of Electrons.** Kerala. Dr N K Jayakumar, Head, Department of Law, University of Kerala, Kariavattom.

Military Studies

1. Bhatnagar, Yogendra Prakash. **Bharat evam Pakistan samasyayen aur sambhavnayen : Ek vishleshnatmak adhyayan.** Jiwaji. Dr Ram Awtar Sharma,Department of Military Science, Government Science College, Gwalior.

2. Kinger, Kamal. **Major irritants in Indo-Bangladesh relations : Impact on India's security.** Punjabi. Dr R N Mishra, Department of Defence Studies, Punjabi University, Patiala.

Education

1. Baljit Kaur. **Performance of sportsmen as a function of some selected psychological variables.** Punjabi. Dr Agyajit Singh, Reader, Department of Psychology, Punjabi University, Patiala.

2. Girija Devi, Thampuratti N R. **Interaction effect of creativity, attitute towards problem solving and social position on the achievement in Mathematics of secondary school pupils.** Calicut. Dr V Sumangala, Department of Education, University of Calicut, Calicut.

3. Kar, Karabi. **A study of the development of primary education in Goalpara District during post-independence period and its impact on society.** Gauhati. Prof Lakshahira Das, Prof (Retd), Gauhati University, Guwahati.

4. Kaushal, Shashi. **Relative effectiveness of individualized and group instructional modules for teaching Bio-sciences to class IX.** Punjabi. Dr R P Goel, Prof, Department of Education, Punjabi University, Patiala.

5. Korah, Valsamma. **An investigation into the structure of reading abilities of Indian students in English.** Jamia. Dr Devendra Joshi, Head, Department of Teacher Training and Non Formal Education, Jamia Millia Islamia, New Delhi.

6. Manoranjani, Y T D J H. **A comparative study of cognitive abilities of high and low level Indian athletes.** Punjabi. Dr Agyajit Singh, Reader, Department of Psychology, Punjabi University, Patiala.

7. Nirmala Devi, S. **The effect of certain social familial variables on some representative convergent thinking and divergent thinking abilities of secondary school pupils.** Calicut. Dr C P Sreekantan Nair, Farook Training College, Feroke.

8. Parhar, Madhu. **A study of effect of media on student learning.** Jamia. Dr Girija Mohd Miyan, Department of Foundation of Education, Jamia Millia Islamia, New Delhi and Dr M Muhtopadhyay, Sr Fellow, National Institute of Educational Planning and Administration, New Delhi.

9. Pillay, Rajam S. **Effect of individualised training programme on communication skills and certain associated variables in the mentally retarded.** Kerala. Dr (Mrs) Vasantha Ramkumar, Head, Department of Education, University of Kerala, Trivandrum.

10. Raina, Tabassum. **Effectiveness of advance organizer model and biological science inquiry model in teaching of Biology.** Jamia. Prof R S Khan, Department of Teacher Training and Non Formal Education, Jamia Millia Islamia, New Delhi and Dr Ajit Singh, National Council for Educational Research and Technology, New Delhi.

11. Salimkumar, C. **The interaction approaches to studying and achievement motivation on achievement in Biology of secondary school pupils.** Calicut. Dr Kamala S Pillai, Department of Education, University of Calicut, Calicut.

12. Sharma, Devendra Ramchandra. **A comparative study of expenses of the educational institutions of secondary education of rural and urban areas of Mehsana District and their impact upon the pupils achievements.** Patel. Dr D N Patel, Department of Education, Sardar Patel University, Vallabh Vidyanagar.

13. Shenbagavalli, A. **Effects on intensive and extensive internal training on muscular performance, cardio vascular efficiency body composition.** Alagappa.

14. Singh, Basant Bahadur. **Developing kindness in school children by discussion of value dilemmas presented through video mode.** Devi Ahilya. Dr Prabhakar Singh, Department of Education, Devi Ahilya Vishwavidyalaya, Indore.

15. Srivastva, Abhay Kumar. **Personality profile of Dr Kokardekar and his contribution to evaluation in physical education.** Amravati. Dr H S Deshpande, Degree College of Physical Education, Amravati.

16. Vandana. **A study of the development of moral reasoning and its corelates.** Dayanand.

17. Ved Parkash. **A study of educational aspirations, school adjustment and values of +2 arts and science male students in relation to school environment.** Punjabi. Dr S B Kakar, Raghbir Nagar, Model Town, Patiala.

18. Venkata Rao, Neelam. **The status and position of women in Ancient Indian culture : An inter disciplinary study.** Andhra.

Commerce

1. Chavan, Hema Nilkanthrao. **Socio-economic impact of rural credit on woman under the Integrated Rural Development Programme : A study of Vadodara District.** Baroda.

2. Ganesh, C. **Role of state financial corporations in promoting small industries : A comparative study of the performance of the State Financial Corporation of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh.** Kerala. Dr M K Ramachandran Nair, Head, Department of Management Studies, University of Kerala, Trivandrum.

3. Gomathi, S. **A study on human resource management and its impact on productivity in Bharat Heavy Electricals Limited, Tiruchirapalli.** Alagappa.

4. Gupta, Subhash. **Indore Jile kee nagarpalika sansthayon ka vittiya prabhandh : Ek vishleshnatmak adhyayan, varsh 1985-86 se 1991-92 tak.** Devi Ahilya. Dr Parasmal Bhamavat, P M B Gujarati Commerce College, Indore.

5. Hareendranath, S. **Finances of Municipal Corporation in Kerala State.** Kerala. Dr M K Ramachandran Nair, Head, Department of Management Studies, University of Kerala, Trivandrum.

6. Joy, P A. **Problems and prospects of trade among SAARC countries.** Jamia. Prof M Saeed, Department of Commerce, Jamia Millia Islamia, New Delhi.

7. Lakshmana Rao, P. **Financial working of the Indian**

corporate sector : A study of public limited companies in private sector, 1961-85. Nagpur. Prof A K Kadrekar, Department of Management Studies and Research, Dhanwate National College, Nagpur.

8. Loitongbam, Memcha. **Growth centre strategy for integrated development planning : A case study of Imphal District, Manipur.** Manipur. Prof V P Giri and Dr S K Sharma, Department of Commerce, Manipur University, Imphal.

9. Narinder Kaur. **India's exprots : An analysis of instability and performance.** Punjabi. Dr Sucha Singh Gill, Department of Economics, Punjabi University, Patiala.

10. Neelam. **Commercial viability of air corporations in India.** Dayanand.

11. Rajagopala Reddi, Sura. **Labour welfare in public sector: A study of select public sector units in Hyderabad.** Andhra.

12. Raju, G. **An Evaluation of Integrated Rural Development Programme with special reference to Kerala State.** Kerala. Dr M K Ramachandran Nair, Head, Department of Management Studies, University of Kerala, Trivandrum.

13. Raveendran, T M. **A study of the socio economic aspects of the problems of the timber and wood based industries in Malabar.** Calicut. Dr T Govindankutty Nair, Department of Commerce, University of Calicut, Calicut.

14. Shukla, Dilip **Kagaj udyog mein utpadan evam vittiya prabandh : Ek niji kshetra ke kagaj ke karkhane ka sarvajanik kagaj karkhane se tulnatmak adhyayan.** Ghasidas. Dr L M Malviya, Department of Commerce, Guru Ghasidas Vishwavidyalaya, Bilaspur.

15. Surinder Paul. **Working capital management in electronics industry in India.** Dayanand.

16. Unuskutty, K K. **An emperical study on plantation schemes financed by primary co-operative agricultural and rural development banks in Kerala.** Kerala. Dr M Sarngadharan, Prof, Department of Commerce, University of Kerala, Trivandrum.

Home Science

1. Hussain, Munira M. **Dietectic management of malnutrition in relation to the development of the preschool children.** Devi Ahilya. Dr Kamlesh Sharma, Prof, Baba Saheb Ambedkar National Institute of Social Sciences, Mahu.

2. Kapadia, Shagufa Babubhai. **Women's empowerment : Identifying psychosocial linkages.** Baroda.

3. Naik, Rama Krishna. **Development of soy based cheese spread.** Baroda.

4. Randhawa, Varinder. **Developing and testing effectiveness of educational intervention on health and nutrition for promoting cognitive learning of anganwadi workers.** PAU.

Management

1. Gurdip Singh. **Operations management in PSEB : A case study of Guru Nanak and Ropar Thermal Plants.** Punjabi. Prof P K Kapoor, Department of Business Management, Punjabi University, Patiala.

2. Nageswar Rao, R. **Financial viability of state transport undertakings.** Osmania.

3. Sat Pal. **Computer utilisation and users satisfaction in public and private sector industries.** Dayanand.

4. Tathgir, Ram Gopal. **An analytical study of management of energy conservation in engineering industry.** Punjabi. Dr R S Sachan, Prof, Department of Business Management, Punjabi University, Patiala.

UNIVERSITY NEWS

A Weekly Journal of Higher Education

Revised Subscription Rates
(Effective 1st December 1994)

	Institutions	Academics/Students
	Rs.	Rs.
1 Year	220 00	125.00
2 Years	400.00	225.00
3 Years	600.00	325.00
5 Years	800.00	500.00

Single Copy : Rs. 7.00

	Airmail	Surface mail
	US$	US$
1 Year	140	100
2 Years	260	180
3 Years	380	260

Subscription is payable in advance by Bank Draft only in favour of Secretary General, Association of Indian Universities.

Advertisement tariff available on request.

Address Subscriptions & Enquiries to :

Deputy Secretary (Publications)
Association of Indian Universities
AIU House, 16 Kotla Marg,
New Delhi-110002.

CLASSIFIED ADVERTISEMENTS

NORTH EASTERN REGIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY

Nirjuli, Itanagar,
Arunachal Pradesh
(Sponsored by North Eastern Council, Shillong)

Advertisement No. 6/94

Applications in the prescribed form are invited from Indian Citizens for the following positions upto 6/1/95 in the pay scales noted against each :

(1) **PROFESSORS:** (i) Agricultural Engineering (ii) Applied Science (Forestry and Allied subjects) (iii) Civil Engineering (iv) Electrical Engineering (v) Electronics/Telecommunications Engineering (vi) Computer Science Engineering (vii) Mechanical Engineering (viii) Mathematics (ix) Physics (x) Humanities (English, Economics, Psychology or Sociology).

Pay scale . Rs. 4500-150-5700-200-7300/-; **Age**: Below 50 years; **EQ**: Excellent academic record with Doctorate in the appropriate field from a recognised University/Institute, minimum 10 years of experience in teaching/research/industry and specialised knowledge in one or more fields. Professional work of outstanding merit and experience of carrying out independent research and guiding research are desirable.

Candidates not possessing Ph.D. in Engineering/Technology may also be considered if they have to their credit equivalent published research/design and development work of high standard either in an institution or in an industry.

(2) **ASSISTANT PROFESSOR:** (i) Agricultural Engineering (Dairy/Processing/Soil Conservation) (ii) Applied Sciences (Forestry and allied subjects) (iii) Civil Engineering (Hydraulics/Sedimentation/Soil Mechanics & Foundation/ Environmental Engineering/Highway/Structural Engineering) (iv) Electrical Engineering (v) Electronics/Telecommunication Engineering (Optical Communication/Molecular Electronics/Data Communication & Network/Non linear optics) (vi) Computer Science Engineering (vii) Mechanical Engineering (Refrigeration & Airconditioning/Applied Mechanics/Production Engineering) (viii) Humanities (English/Economics/Psychology/Sociology)

Pay scale: Rs. 3700-125-4950-150-5700/-; **Age**: Below 45 years; **EQ**: A Consistently good academic record with a Doctorate in the relevant field. About 5 years' experience in teaching and/or research and development. Candidates not possessing Ph.D. in Engineering/Technology may also be considered if they have to their credit equivalent published work of high standard in a recognised institution or in an Industry.

(3) **LECTURERS:** (i) Agricultural Engineering (Soil Conservation/Farm Machinery/ Dairy/ Agricultural processing) (ii) Civil Engineering (Geology/Soil Mechanics and Foundation/Environmental Engineering/Highway Engineering/ Structural Engineering) (iii) Computer Science/ Engineering (iv) Electronics (v) Mechanical Engineering (vi) Physics (vii) Applied Sciences (Forestry and allied subjects) (viii) Geology.

Pay scale : 2200-75-2800-100-4000/-: **Age** : Below 40 years, **EQ**: (i) First class Bachelor's Degree in appropriate branch of Engineering and Technology (ii) Qualifying in an All India Examination (such as GATE or equivalent). **Desirable** : (i) A good Master's Degree in appropriate field of engineering and technology or Doctorate Degree in relevant field of Forestry and allied subjects/Humanities and Sciences. About one year's experience in teaching/ research/Industry.

(4) **REGISTRAR: Pay scale** : Rs. 3700-125-4700-150-5000/-; **Age**: Below 45 years; **EQ**: A post graduate degree with at least 55% marks or its equivalent grade (ii) 10 years' experience in educational administration, OR Comparable experience in research establishment and other institutions of higher education OR 10 years of administrative experience of which 5 years as Deputy Registrar or an equivalent post.

(5) **ASSISTANT REGISTRAR : Pay scale**: Rs. 2200-75-2800-EB-100-4000/-; **Age**: Below 40 years; **EQ**: A post graduate degree with at least 55% marks or its equivalent grade (ii) 5 years' working experience in a Group-B post in handling Academic/Administration/Accounts/Stores/Purchase etc. in a University or other Government institution.

(6) **LIBRARIAN: Pay scale** : Rs. 2200-75-2800-EB-100-4000/-; **Age**: Below 40 years; **EQ**: First or second class M.Lib. Science Degree or First class B.Lib. Science with 5 years of experience in a recognised University or Institution Library.

(7) **CHIEF INSTRUCTOR** (Physical Education) : **Pay scale** : Rs. 2200-75-2800-EB-100-4000/-. **Age**: Below 40 years. **EQ**: Master's Degree in Physical Education with 5 years' experience in a teaching Institute or in a State Sports organisation.

For application forms write to Deputy Registrar (Admin), NERIST, NIRJULI-791109, ARUNACHAL PRADESH, enclosing a self-addressed Rs. 2/- stamped envelope (23 cm x 10 cm) together with a fee of Rs. 7.50 (Rs. 2.50 for SC/ST) in crossed Bank Demand Draft payable to Director, NERIST, on any scheduled Bank at Itanagar. Candidates from abroad may apply on plain paper.

Age and experience are relaxable as per prescribed norms in the case of SC/ST and other exceptional cases.

Applications complete in all respects along with attested/photocopies of the Certificates, testimonials etc. should reach Registrar, NERIST, on the above address by Registered post only. Candidates who have already applied vide this office advt. No 1/91 and 2/93 to any of the above mentioned positions need not apply again but may only indicate their willingness to be considered. Incomplete applications and applications received late will not be considered.

DEPUTY REGISTRAR (ADMIN)

SCHOOL OF PLANNING AND ARCHITECTURE
NEW DELHI
(Deemed to be a University under Section 3 of UGC Act)
4, Block-B, Indraprastha Estate, New Delhi-110002

APPOINTMENTS

Applications are invited from Indian Nationals for the following non-teaching posts in the School :

Sl No	*Names of the Posts*	*No of posts*	*Age limit as on 30-11-1994*	*Pay-scale*
SPECIAL RECRUITMENT DRIVE FOR SCs/STs				
1	Documentation-cum-Publication Officer	One (SC)	below 40 yrs.	Rs. 2200-4000
2	Sports Officer	One (ST)	below 30 yrs.	Rs. 2200-4000
3.	System Operator	One (SC)**	below 25 yrs.	Rs. 1400-2300
4	Sr. Stenographer	Two (1 SC & 1 ST)	below 30 yrs	Rs. 1400-2300
5.	Jr. Stenographer	Three (2 SC & 1* ST)	below 25 yrs.	Rs. 1200-2040
6.	Documentation Assistant	One (SC)	below 30 yrs.	Rs. 1200-2040
7.	Building Maintenance Inspector	One (SC)	between 35 & 50 yrs.	Rs. 1200-1800
8.	Hindi Typist	One (ST)	below 25 yrs	Rs. 950-1500
9.	Library Assistant	One (ST)	below 25 yrs	Rs. 950-1500
10	Electrician	One (SC)	below 30 yrs.	Rs. 950-1500

N.B.* 1 vacancy of Junior Stenographer reserved for Scheduled Tribes candidates is interchangeable amongst SCs and STs candidates if suitable STs candidates are not available for recruitment.

GENERAL POSTS

1.	Works Engineer	1	below 35 yrs.	Rs. 1640-2900
2.	Senior Stenographer	1**	below 30 yrs.	Rs. 1400-2300
3.	System Operator	1**	below 25 yrs.	Rs. 1400-2300
4.	Audio-Visual Assistant	1	below 30 yrs.	Rs. 1350-2200
5.	Junior Stenographer	1**	below 25 yrs.	Rs. 1200-2040
6	Electrician	1	below 30 yrs.	Rs. 950-1500

** NB: Posts temporary until approved by the Govt. of India.

Age limit relaxable upto 5 years for displaced persons, SCs, STs, Physically Handicapped, Ex-Servicemen/Commissioned Officers including ECOs/SSCOs/Meritorious Sportsmen/ Sportswomen and residents of Assam, employees of the Government/Semi-Government undertakings/Autonomous Bodies.

QUALIFICATION AND EXPERIENCE

1. SPORTS OFFICER

Essential. i) A Master's Degree in Physical Education (High Second Class) with diploma in Sports coaching from a recognised Institution. OR

A Masters Degree in Physical Education (High Second Class) with a record of having represented his University at the inter-university level/States in the National Championship.

ii) Experience in organising games and sports (as exemplified in handling of about half a dozen teams in a year in his institution and their participation in university/inter-college tournaments and ability to encourage mass participation in games and sports.

2. DOCUMENTATION-CUM-PUBLICATION OFFICER

Essential: i) Atleast Second Class Master's Degree in a subject other than Library Science;

ii) Degree in Library Science or equi-valent from a recognised university;

iii) Seven years' experience in Library work.

3. WORKS ENGINEER

Essential: i) First Class Diploma (after completion of three-year course) of a recognised Institution in Civil Engineering and;

ii) At least 5 years' experience in the Design & Construction of Buildings, including experience in Measurement book, recording of measurements in M.Bs., maintenance of work registers, preparation of bills and experience in maintenance of buildings, repairs, management and upkeep of lands and estates.

Desirable: Adequate knowledge of electrical, mechanical, water supply and sanitary installations in multi-storeyed buildings

4. SYSTEM OPERATOR

Essential: Graduate in Science/Arts (with mathematics) with at least one year's experience in operation of micro or mini computer.

Description of Duty :

Shall be in-charge of a shift in the Computer Centre. Main responsibility shall be to ensure the proper working and maintenance of System hardware/software. Maintenance of all the computer documents Shall assist computer users, in use of hardware, software and other facilities available in the Computer Centre. Data Entry, assistance in programming and any other duties/responsibilities assigned by the authorities.

5. SENIOR STENOGRAPHER

Essential: (i) Bachelor's Degree of a recognised University or equivalent, (ii) Shorthand and typing speed at 100/40 words per minute in English and; (iii) Experience in secretarial/clerical work.

6. AUDIO-VISUAL ASSISTANT

Essential: (i) Matriculation, with Science, atleast second division, of a recognised University/Board; (ii) Diploma in photography of a recognised institution OR atleast three years' practical professional experience in Still/Cine Photography in a Central/State Government Department/Museum/Private Studio of repute; and (iii) Ability to handle audio-visual equipments, including movie and still cameras and projectors, sound recording and reproduction equipments, dark room equipments, photostat and electronic copying machines.

Desirable: (i) Smartness, with ability to explain and demonstrate technical processes to students and capability to maintain harmonious relationships with Students/Faculty.

7. JUNIOR STENOGRAPHER

Essential: (i) Matriculation of a

recognised University/Board or equivalent; (ii) English shorthand and English typewriting speed at the rate of 80/40 words per minute respectively

8. BUILDING MAINTENANCE INSPECTOR

Essential: i) Matriculation of a recognised University or its equivalent; and (ii) Ex-Junior Commissioned Officer with at least service of five years' as J.C O. from Army/Navy/Air Force or equivalent Ranks, preferably with experience in Security and Sanitation work.

Desirable· Valid driving licence for motor vehicles.

9. HINDI TYPIST

Essential· (i) Matriculation or equivalent qualification with Hindi as one of the subjects of a recognised University or Board of Education and (ii) Hindi Typewriting at a speed of not less than 25 words per minute

10. LIBRARY ASSISTANT

Essential: (i) Matriculation/Higher Secondary or equivalent from a recognised Institution/Board, and (ii) Certificate in Library Science from a recognised Institution

Desirable· Knowledge of English Typewriting and experience in Library Work

Description of Duties. Preparing and filling of catalogue Cards, accessioning, counter duties, etc

Others (i) To attend the duties in shifts, (ii) the library Stacks are two tier and individual should have no hesitation in presenting the book to readers after climbing stairs.

11. DOCUMENTATION ASSISTANT

Essential· (i) Bachelor's Degree of a recognised University with Certificate Course in Library Science of one academic year duration from a recognised University/Library Association, and (ii) working knowledge of Documentation and Universal Decimal Classification Scheme.

12. ELECTRICIAN

Essential: Five years' skilled working experience as an Electrician

Desirable: National Trade Certificate of Craftsmanship as Electrician, or National Apprenticeship Certificate of Electrician or equivalent.

GENERAL CONDITIONS

The posts carry usual allowances as per Central Government Rules and also carry benefits of GPF-cum-Pension-cum-Gratuity and Central Government Health Scheme.

Applications on PLAIN PAPER and addressed to the Registrar of the School, giving details of name, address, date of birth, qualifications and experience, Caste (whether SC/ST/OBC) etc. accompanied by two copies of recent passport size photograph, attested copies of certificates and testimonial and a crossed Demand Draft of Rs 50/- (Non-Refundable) as the Application Fee (Scheduled Castes/Tribes candidates are exempted from payment of the Application Fee) drawn in favour of the SCHOOL OF PLANNING AND ARCHITECTURE payable at NEW DELHI should reach the Registrar of the School **latest by 19th December, 1994**. Applicants, who are in the employment of Government/ Semi-Government Undertaking/ Autonomous Body, must send their application through proper channel. Separate Application should be submitted for each post. An application will be summarily rejected at any stage of the recruitment process for having incomplete information/wrong information/mis-representation of facts/left unsigned/submitted without the prescribed fee where due/not accompanied by attested copies of certificates in support of their claim for educational qualifications, age and category (SC/ST/EXS/PH/ OBC) etc.

The School reserves the right to increase or decrease the number of posts, not to make recruitment to any post and to shortlist candidates for tests/interviews and to accept or reject any application without assigning any reason.

No correspondence whatsoever will be entertained from candidates regarding postal delays, conduct of tests/interviews, result of tests/interviews and reasons for not being called for tests/interviews.

BANASTHALI VIDYAPITH

(Deemed to be University)

Applications are invited on plain paper for one Junior Research Fellow (Rs. 1800/- p.m.) and one Research Associate (Rs. 2500/- p.m.) for the project "COMBINATORICS OF GRAPHS AND FINITE SETS" initially for one year but renewable for two more years. The minimum eligibility for Junior Research Fellow is Post-graduate degree & for Research Associate is Ph.D in the relevant discipline Non Ph.Ds may be considered for appointment of SRF (Rs. 2100/- p.m.) if they have experience.

Applications should reach Dr. Aditya Shastri, the Principal Investigator, Banasthali Vidyapith, P.O. Banasthali Vidyapith-304 022 (Rajasthan) latest by **17th December, 1994**.

MANONMANIAM SUNDARANAR UNIVERSITY

NOTIFICATION

No. MSU/Estt/T/Adv./7/94

Applications are invited from suitable candidates for the posts mentioned below for the Departments in Manonmaniam Sundaranar University, Tirunelveli-8, Tamil Nadu. The applications will be issued from 23.11.1994 to 28 12.1994 and the filled in applications will be accepted upto **5.1.1995.**

I. Reader in Statistics - 1 Post (OC)

Qualifications : 1. Masters degree in Statistics with 55% marks; 2. Ph.D degree in Statistics.

Experience : Five years P.G. Teaching & Research Experience.

Scale of Pay : Rs. 3700-125-4950-150-5700 plus usual allowances.

II. Lecturer in Sociology - 1 Post (OC)

Qualifications : 1. Masters degree in Sociology with 55% marks; 2. Ph.D. degree in Sociology; 3. Pass in SLST/NET.

III. Lecturer in Mathematics - 1 Post (OC)

Qualifications : 1. Masters degree in Mathematics with 55% of marks; 2. Ph.D. degree in Mathematics, 3. Pass in SLST/ NET.

IV. Lecturer in Aquaculture - 1 Post (OC)

Qualifications : 1. Masters degree in Biology/Zoology with 55% of marks; 2. Ph.D. degree in Biology/Aquaculture, specialisation in Mari-culture/Fishery Science preferable; 3. Pass in SLST/NET.

V. Lecturer in History : 2 Posts (OC -1, SC - 1)

Qualifications : 1 Masters degee in History with 55% of marks; 2. Ph.D. degree in History; 3. Pass in SLST/NET.

Scale of Pay : Sl. No. II to V : Rs. 2200-75-2800-100-4000 plus usual allowances.

Prescribed application forms can be had from the **Registrar, Manonmaniam Sundaranar University, Tirunelveli-8** on requisition with a Demand Draft for Rs. 50/- drawn in favour of the Registrar, Manonmaniam Sundaranar University, Tirunelveli on any one of the Nationalised Banks payable at Tirunelveli in person or by post by sending a self addressed stamped envelope (23 x 10 cm) to the value of Rs. 10/-. Treasury Challans/Money Orders/Postal Orders will not be accepted under any circumstances.

Abishekapatti,
Tirunelveli-8

Dr. S. Selvanathan
REGISTRAR

SOME USEFUL PUBLICATIONS

ENVIRONMENTAL CHALLENGES AND THE UNIVERSITIES

The Association of Indian Universities organised on 19 December, 1993, as a part of its 68th Annual Meeting, a seminar on "Environmental Challenges and the Universities." This seminar reflected the concern of the universities regarding the challenges faced by the country on the environmental front, and endeavoured the role of universities have played, or may adopt in the future, in dealing with the problems of the environment.

The papers presented at the Seminar reflect the status of teaching and research in environmental studies in the Universities, detail of contribution made by them towards sustainable development, and gives the status assessment of two key regions. Case studies on the work on different environmental problems dealt with by the universities are also included. The need to act in coordination and make environmental education and research an integral part of the University System has been emphasised.

Price Rs. 150/-

EXCELLENCE ACHIEVING SOCIAL RELEVANCE IN HIGHER EDUCATION

Papers presented at the seminar held on the occasion of the 67th Annual Meeting of the Association of Indian Universities at Pondicherry University in 1993. The seminar reviewed the role of extension and the involvement of the universities in the community life. And audit of the use of human resources available in the universities for community development was considered as necessary as an assessment of the spectrum of extension activities. There was a general consensus among the 106 Vice Chancellors/Directors of Universities and university level institutions of higher learning that bridges need to be built between the world of work and the world of learning and that it was necessary for the universities to integrate social work in their curricula, conduct participative research and develop action techniques.

Price Rs. 150/-

DECENTRALISATION OF HIGHER EDUCATION SYSTEM

The Association of Indian Universities (AIU) feeling concerned about the need for improving the efficiency of the university system to make it innovative, creative and more responsive to the societal needs organised a National Seminar on 'Decentralisation of Higher Education System.' Organised on the occasion of the 66th Annual Meeting of the Association at Thiruvananthapuram on October 8, 1991. The Seminar was attended by Member Vice Chancellors and the following sub themes were debated at length.

1 Decentralisation in the UGC (Regional Offices, State Councils of Higher Education);
2 Decentralisation within the University System;
3 Decentralisation in Academic Management of Universities/Colleges; and
4 Financial Autonomy and Accountability.

Professors A M Khusro, V C Kulandai Swamy, A Gnanam, (Mrs) Rajammal P Devadas and D M Nanjundappa presented lead papers on the main theme and sub-themes.

The publication comprises report of the proceedings including the consensus and summary of discussions and the papers presented at the seminar.

Price Rs. 100/-

Please address enquiries to:

Deputy Secretary (Publications)
Association of Indian Universities
AIU House, 16 Kotla Marg, New Delhi - 110 002
Telephones: 3310059, 3312429, 3313390, 3312305
Telex: 31-66180 AIU IN
Fax: 011-3315105
GRAM : ASINDU

Published by SUTINDER SINGH, on behalf of the Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi-2. Grams: ASINDU. Phones: 3310059, 3312305, 3312429, 3313390, 3323097 and 3712435. Fax : 011-3315105 Telex : 31-66180 AIU I
Printed by Navchetan [illegible] (P) Ltd. at Navchetan Printers, 1-E/2, Jhandewalan Extension, New Delhi-110055. Tel. 529157